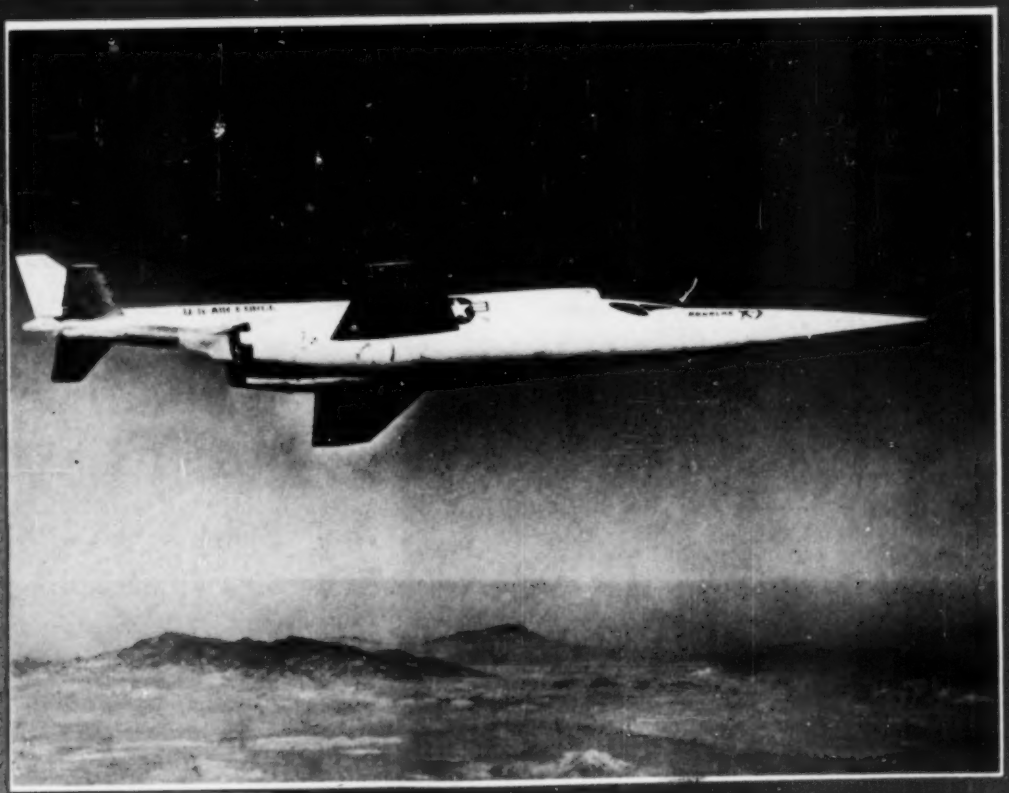
DECEMBER, 1934 Vol. 43, No. 10

Industrial Arts and Vocational Education



The Shop Teachers' Professional Magazine

PRE-CONVENTION NUMBER

IT ALL DEPENDS . . .

The substance in the picture looks in part like coal and in part like tar. As a matter of fact, it can be further processed into oil and gasoline and chemicals of many kinds. For the "what is it?" of any substance depends on the influences to which the substance is exposed.

The same question, "What is he?" can be asked about any lad in a classroom but the answer will not be found until later in life when his nature and character will be the sum and substance of all the influences that have been brought to bear on his original potentialities which are great and inexhaustible.

That is why conscientious educators are constantly on the alert, seeking the influences they can use in shaping the lads in their classrooms . . . and seeking to *apply* the influences in the right and proper way at the right and proper time.

At the beginning of a school year, the first assembly in class, much depends on what the educator does. No competent instructor in mechanical drafting will make the mistake of compromising the boy's interest in the work, nor the respect in which it may be held. No such instructor will permit mere economy to dictate the purchase of cheap and shoddy drawing instruments. For here is an influence that does not exhaust itself in a day or a year but can reflect itself into the boy's mind throughout all the years to come. Here may be one of the most important decisions pupil and teacher may ever make: *which drawing set?*

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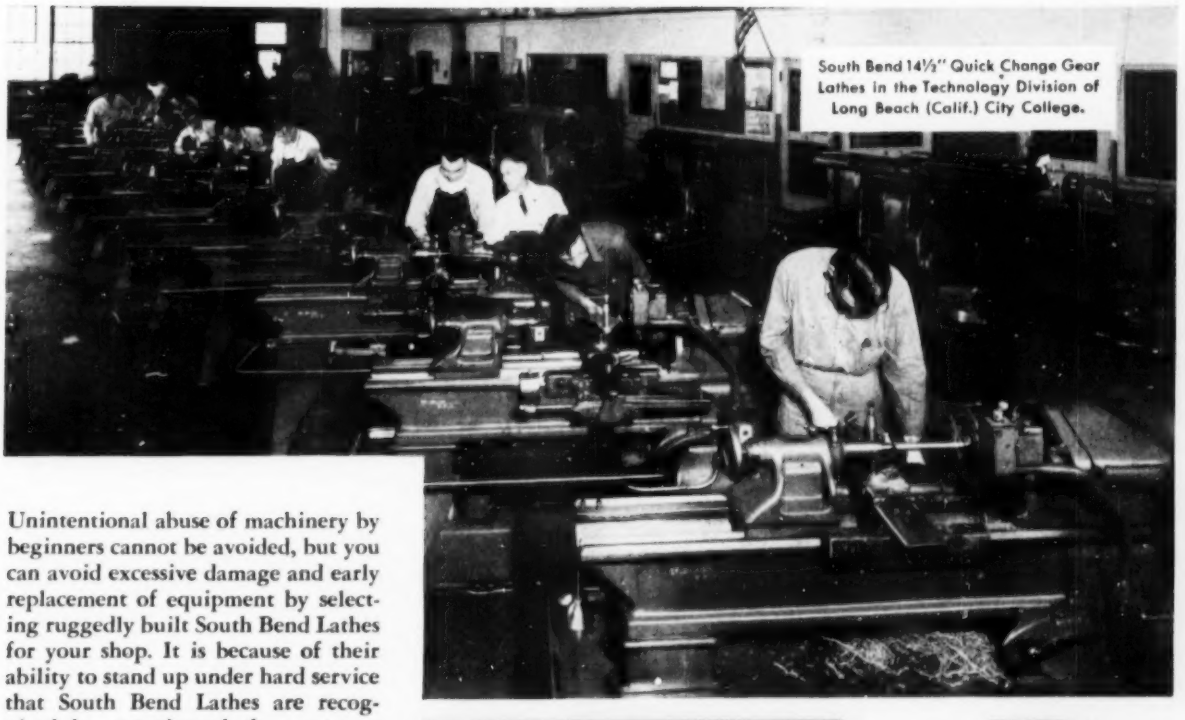
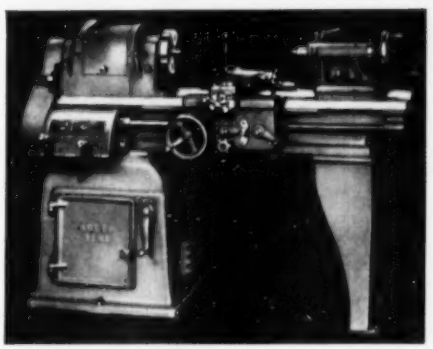


South Bend 14½" Quick Change Gear Lathes in the Technology Division of Long Beach (Calif.) City College.

Unintentional abuse of machinery by beginners cannot be avoided, but you can avoid excessive damage and early replacement of equipment by selecting ruggedly built South Bend Lathes for your shop. It is because of their ability to stand up under hard service that South Bend Lathes are recognized by experienced shop men as top value for educational institutions.

Built-in automatic safety devices make it impossible to damage the lathe by engaging two opposing feeds simultaneously. Belt drive to the spindle assures smooth, quiet operation and helps absorb shock if work or carriage stalls. Simplicity of design contributes to the sturdiness of the lathe and makes for an ease of operation which enables students to become proficient with minimum instruction.



South Bend 14½" x 5' Quick Change Gear Lathe — f. o. b. factory, less electrical equipment, $1809. Time payments — 10% down, 18 monthly payments.

Teaching Helps

Instructional material to make your teaching easier—handbooks on operation of lathes, drill presses, shapers — book of projects — wall charts — free-loan, sound, color movies and slides on lathe operation — scale models for shop planning. Samples of printed material free to shop instructors. *Write for them.*

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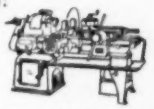

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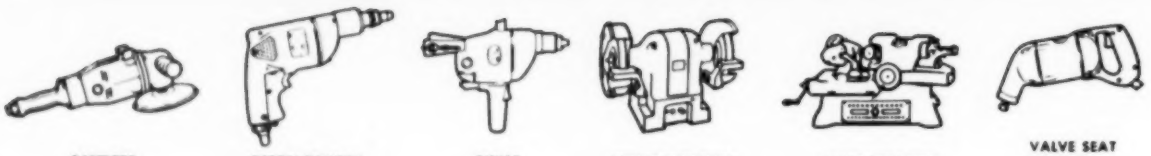

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DECEMBER
1954

VOL. 43 NO. 10

Industrial Arts and Vocational Education

The Shop Teachers' Professional Magazine

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★ ★ ★ ★

This Month's Cover

The Flying Stiletto! The ancient craftsmanship of the blacksmith helped forge the wings for the supersonic Douglas X-3 twin-jet aircraft shown. The basic structures of the research jet's wings were machined from one piece, 2000-lb. aluminum forgings made in Aluminum Company of America's Cleveland, Ohio, works.

★ ★ ★ ★

The 1954 Index

If you wish to secure an index for Volume 43, write to our circulation department and a copy of the index will be sent to you as soon as it is off the press.

★ ★ ★ ★

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Association News

THE 1954 AVA CONVENTION

More than 3000 industrial arts and vocational educators are expected to register for the 48th Annual American Vocational Association Convention which will be held in San Francisco, December 2 through 7. Registration will start Thursday morning, December 2, in San Francisco's Civic Auditorium, where throughout the convention week more than 150 educational and commercial exhibits will be on display.

Highlighting the more than 100 general and sectional meetings will be a roster of nationally known speakers, expert in various fields of education, labor, management, and economics headed by the Honorable Herbert Hoover, former President of the United States.

According to Dr. Lynne C. Monroe, University of California, Santa Barbara College, and program chairman for the industrial arts section, the program which will be offered should be interesting and at the same time add to the professional advancement of all persons interested in industrial arts. Industrial education in the general comprehensive high school, the use and operation of television in industrial arts, as well as new developments in industrial arts will be discussed.

A full afternoon of demonstration in graphic arts, woodworking, electricity, and oil conservation, has been prepared.

Among the topics which will be discussed at general meetings will be: Where Are We, and Where Are We Going in Agricultural Education; Agriculture Is Big Business; Improving Instruction Through Organization; The Place of the Young Farmer Program in the Total Vocational Agriculture Program; What's New in Teaching Techniques in Business Education?; What's New in Supervision in Business Education?; What's New in Trends and Requirements for Employment in Business?; The Need for Further Development for Distributive Education; Young People in Trouble — How May We Help Them?; The Needs of Adults in Home and Family Living; What Is Homemaking Education's Contribution?; Management and Labor's Interest in Vocational Education; Recent Trends in Supervisory Training; Vocational Education in Correctional Institutions; Graphic-Arts Education.

On Sunday evening, December 5, delegates to the convention and their families will be the guests of the Standard Oil Company of California at a nationwide broadcast of the Standard Hour beginning at 8:30 p.m., P.S.T. The San Francisco Symphony which will broadcast at this time will play under the direction of its new conductor, Enrique Jorda; the featured soloist will be the great pianist Grant Johannesen.

While attending the convention, the delegates will have time to visit some of the outstanding landmarks of San Francisco and the Bay Area. Among these are the S.F.-Oakland Bay Bridge — which is the world's largest; the Golden Gate Bay Bridge — with the longest single span in the world; the Latin Quarter with a population of in excess of 50,000 French, Italian, and Spanish, and the largest Chinatown in the United States.

Cultural opportunities will be available for those who plan to visit the Academy of Sciences, Art Museums, Colleges-Universities, Historical Collections, Aquarium, Collections of California, Libraries, and Schools of Fine Arts, Modern Design.

San Francisco's great number of world famous restaurants feature cuisines from the entire world. Among the national foods featured by specialty restaurants are American, Armenian, Bohemian, Chinese, Fish Grottoes, French, German, Greek, Hungarian, Italian, Japanese, Kosher, Latin American, Russian, Spanish, Swedish, Swiss, and the South Seas.

1954 FOUR-STATE CONFERENCE HELD AT PITTSBURG, KANSAS, OCTOBER 1–2

The 12th Annual Four-State Conference on Industrial Arts and Vocational Education was held at the Kansas State Teachers College in Pittsburgh, on Friday and Saturday, October 1 and 2. Approximately 500 instructors, supervisors, co-ordinators, and directors from the region of Arkansas, Kansas, Missouri, and Oklahoma were in attendance.

Speakers at the general sessions were Paul R. Leach, Jr., of E. I. du Pont de Nemours of Chicago; G. E. Benson of Harding College, Arkansas; and G. Harold Silvius of Wayne University, Detroit. Ten sectional meetings were held during the two days, dealing with problems in the fields of industrial arts, trade and industrial education, and distributive and co-operative part-time programs. Thirty commercial exhibitors provided a variety of exhibits of machine and hand tool equipment.

(Continued on page 6A)

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ASSOCIATION NEWS

(Continued from page 4A)

instruments, books and shop materials and supplies. A number of school exhibits also were on display.

M. J. Ruley, director of industrial arts and vocational education, Tulsa, Okla., public schools, was elected chairman of the steering committee of the conference for 1955. The conference planning committee will meet, to plan the conference for October, 1955, next April. The trade and industrial sectional meetings for this conference will be developed by Arkansas; Kansas will develop the distributive and co-operative part-time programs; Missouri will develop the industrial-arts programs; and Oklahoma will arrange for speakers for the general sessions. Many important suggestions for the improvement of the 1955 conference were listed on cards distributed at the last general session of the conference on Saturday afternoon, October 2.—*J. V. Melton.*

CONFERENCE HELD AT THE STOUT INSTITUTE

Industrial education teachers from throughout Wisconsin and eastern Minnesota met at The Stout Institute campus Friday, October 29, for a special conference featuring demonstrations of new processes and products in the field of industrial arts.

All participants registered the morning of October 29 between 8:30 and 9 o'clock at a registration center in Harvey Hall on the Stout campus. The total attendance was then divided into four groups, each of which attended one of the four sections comprising the conference program.

These sections were then repeated four times during the day so that every person at the conference could attend all of them. Arrangements were directed by Dr. Herbert Anderson, chairman of The Stout Institute woodworking department.

The graphic arts portion of the conference was presented by Lloyd Whydotski, chairman of the graphic-arts department at Stout. Offered in this section was a participating demonstration of elementary pamphlet binding. This section has also developed a general graphic arts "corner" display, showing what may be considered a graphic-arts area of the general shop.

Robert Swanson, assistant professor of industrial education at the college, was in charge of that part of the conference devoted to plastics. Special stress was laid upon three-dimensional forming of acrylic plastics.

Conference participants attending the tool and die making section could view cutting and forming of nonferrous metals. Dick G. Klatt, of the general metal department of Stout Institute, was in charge.

A visiting expert on wood and new wood products, Ernest Nelson, supervisor of industrial arts for the public schools of Superior, Wis., demonstrated the construction of laminated wood projects. An important innovation in the field of woodworking, laminated wood construction is becoming widely used in the manufacture of contemporary furniture.

In addition, George Soderberg, specialist in wood finishing at Stout, displayed newly developed finishing materials and K. T. Olsen, specialist in carpentry and upholstery techniques at the college, described the newest materials for upholstery.

THE INTERNATIONAL GRAPHIC ARTS EDUCATION ASSOCIATION CONFERENCE AT BOULDER

Over 150 printing teachers from 40 states and Montreal, Que., Canada, attended the 29th annual conference of this association at the University of Colorado, Boulder, Colo., July 4–9, 1954.

At the opening general session, Samuel M. Burt, executive secretary, presented the annual report of activities. Then the group separated into four workshops. The one on college education was conducted by Kenneth R. Burchard, Carnegie Institute of Technology, Pittsburgh, Pa.

The second, devoted to teacher training, was led by Milo T. Oakland, Northern Illinois State Teachers College, DeKalb, Ill.

The third group discussed vocational training under the leadership of Charles E. Kennedy, Southern School of Printing, Nashville, Tenn.

Industrial arts was the subject taken up by the fourth group, with Bruce D. Cheadle as the leader.

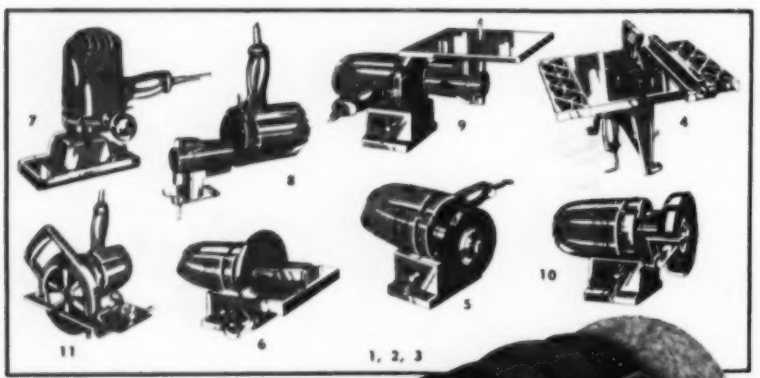
In another general session, graphic arts education in all its phases was reviewed by a number of speakers.

The address, "Photography in the Graphic Arts Program," by Harry A. Goldstein, Tucson Senior High School, Tucson, Ariz., was especially well received.

The new officers elected for the year 1954–55 are: president, Kenneth R. Burchard, Pittsburgh, Pa.; vice-president, Otto H. Chidester, Tucson, Ariz.; secretary, Charles E. Kennedy, Nashville, Tenn.; treasurer, Vincent C. Coyne, New Brunswick, N. J.

The next conference will be held at the Carnegie Institute of Technology Campus, Pittsburgh, Pa.

(Continued on page 8A)



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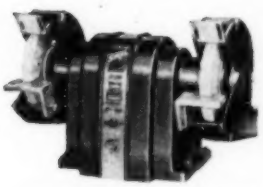

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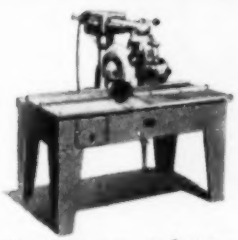
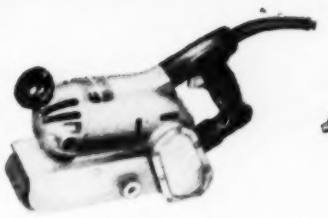


SKIL Radial Saw—*Safest!* Front controls! Retractable arm clears work area. Easy blade-guard adjustment. Recessed controls prevent accidental starting. Building trade classes need this instruction! Will handle almost all maintenance wood-cutting!



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ASSOCIATION NEWS

(Continued from page 6A)

COMING CONVENTIONS

Dec. 3–7. American Technical Education Association, AVA Convention, San Francisco, Calif. Secretary, Frank J. Coyle, 23 S. Pearl St., Albany, N. Y.

Dec. 3–7. American Vocational Association, at St. Francis Hotel, San Francisco, Calif. Secretary, M. D. Mobley, 1010 Vermont Ave. N.W., Washington, D. C.

Dec. 26–31. American Association for Advancement of Science, at Shattuck Hotel, Berkeley, Calif. Secretary, Dr. Dale Wolfle, SSAS, 1515 Massachusetts Ave. N.W., Washington 5, D. C.

INDUSTRIAL ARTS ASSOCIATION OF PENNSYLVANIA

The Allegheny County Branch of this association held its first meeting for this year on September 28, 1954, at 7:30 p.m., in Vulcan Hall, California State Teachers College, California, Pa.

They were the guests of the Epsilon Pi Tau Fraternity with Mr. Stavaski in charge of the installation of officers.

The October meeting of the association was held in Pittsburgh during the Institute, on October 15.

The Institute Luncheon was held on October 15, at 12:00 noon, at The Cameo Center, Pittsburgh.

The state meeting of the Industrial Arts Association was held in Hershey, on October 22 and 23.

♦ With Wisconsin vocational, trade, and industrial teachers in attendance from throughout the state, Institute Z was held at The Stout Institute from June 14–18. Institute Z was a workshop conference, sponsored by the Wisconsin State Board of Vocational and Adult Education, as a means for teachers of trade and industrial education to meet part of Wisconsin's certification requirements.

The title of Institute Z was "Evaluation Techniques in Trade and Industrial Education." Among the trade areas whose teachers were represented were such fields as auto mechanics, welding, aircraft, barbering, woodwork, carpentry, sheet metal, electricity, radio, and others.

Leading the workshop were the following personnel of the Wisconsin State Board of Vocational and Adult Education:

H. C. Thyer, chief of trade and industrial education; Arthur Larson, supervisor of occupational information and guidance; John Plenke and Martin Wesolowski, supervisors of trade and industrial education; and Roy Fairbrother, supervisor of distributive education.

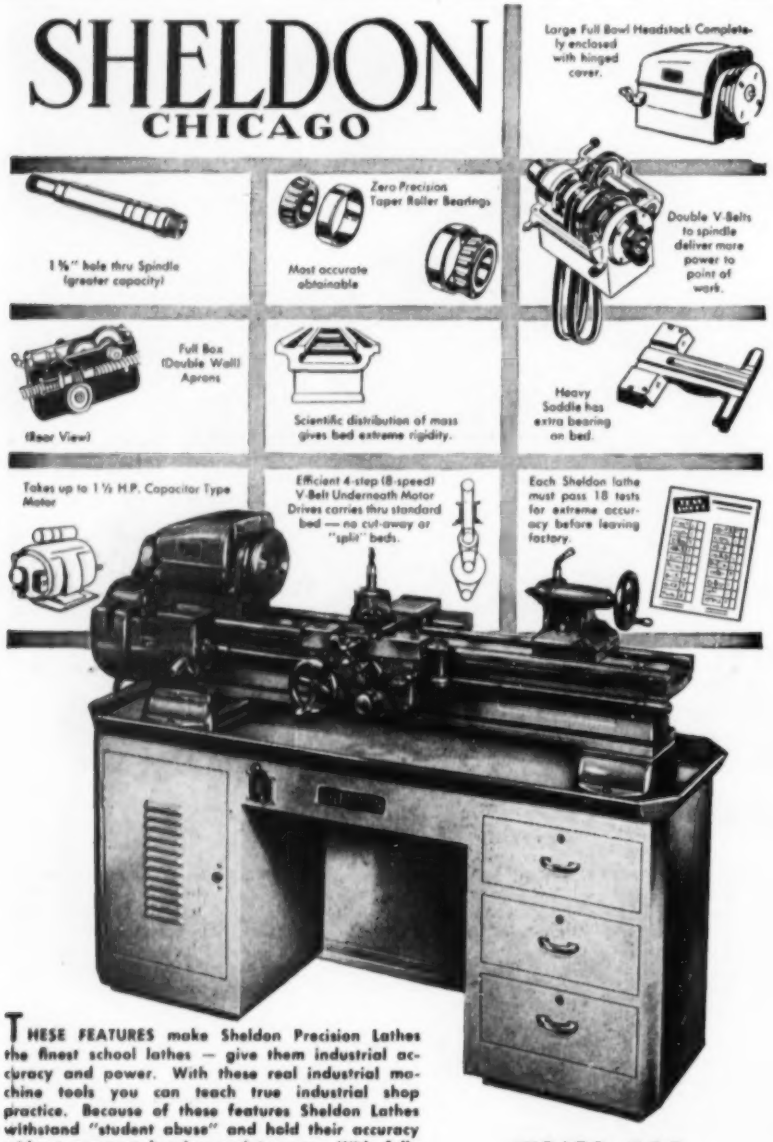
♦ A workshop of the American Council of Industrial Arts Supervisors was held in conjunction with the 16th annual convention of the American Industrial Arts Association, March 23 to 26, at Hotel Statler, Los Angeles, Calif.

The California industrial-arts supervisors present at this meeting agreed to compile a questionnaire which would be sent to the members of the ACIAS.

This questionnaire was based upon data from the doctoral study of Dr. H. O. Schorling, head, division of fine and practical arts, Fresno State College. Additional material was obtained from a publication on "Administration and Supervision of Industrial Arts" by Dr. H. A. Sotzin, head, industrial-arts department, and chairman, division of applied arts, San Jose State College.

♦ The Central New York Industrial Arts Teachers Association sponsored an "Industrial Arts in your Public Schools" exhibit at Syracuse, N. Y., during the first week in September. One hundred four pupils from a score of participating schools were on hand each day of the week, with 38 teachers. Projects from school shops were exhibited as a background for the "live demonstrations put on by boys and girls. One of the activities was the printing of wallet size calendars, which were given out to the public. This was done by boys on a small letter press. Activities changed daily. Each school presented its specialty. About two dozen different activities were worked out, including such things as wood turning on the lathe, jig-saw work, enameling on copper, ceramics, loom weaving, art metal work, and leather tooling.

SHELDON
CHICAGO


Large Full Bowl Headstock Completely enclosed with hinged cover.
1 ⅝" hole thru Spindle (greater capacity)
Zero Precision Taper Roller Bearings
Most accurate obtainable
Double V-Belts to spindle deliver more power to point of work.
Full Box (Double Wall) Aprons
(Rear View)
Scientific distribution of mass gives bed extreme rigidity.
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Takes up to 1 ½ H.P. Capacitor Type Motor
Efficient 4-step (8-speed) V-Belt Underneath Motor Drives carries thru standard bed — no cut-away or "split" beds.
Each Sheldon lathe must pass 18 tests for extreme accuracy before leaving factory.

THESE FEATURES make Sheldon Precision Lathes the finest school lathes — give them industrial accuracy and power. With these real industrial machine tools you can teach true industrial shop practice. Because of these features Sheldon Lathes withstand "student abuse" and hold their accuracy without constant bearing maintenance. With fully enclosed headstocks and available with lever-operated speed-changes. They are safe for students to operate.

WRITE FOR CATALOG

SHELDON MACHINE CO., INC. 4244 N. Knox Avenue CHICAGO 41, U. S. A.

Personal News

DR. HOMER J. SMITH TO PAKISTAN

Dr. Homer J. Smith, emeritus professor of industrial education, University of Minnesota, Minneapolis, Minn., left on October 3 for at least a year's stay in Pakistan, with residence at Lahore. Dr. Smith and his wife were members of a party going from Washington State College, Pullman, to engage in a college-exchange program under the Foreign Operations Administration. Dr. Smith will serve as consultant on technical education and will

(Continued on page 16A)

COLUMBIAN VISES are preferred by schools... EVERYWHERE!

Dependability, ease of operation, long life —these are only a few of the many reasons why more Columbian Vises are used in school shops than any other make.

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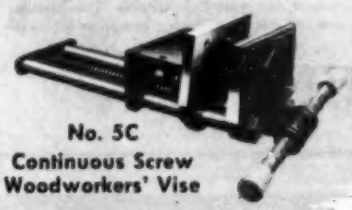

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Continuous Screw
Woodworkers' Vise

No. 5CD-S
Continuous Screw
Adjustable
Steel Handle

No. 6CD
"Woodcraft"
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No. 72½
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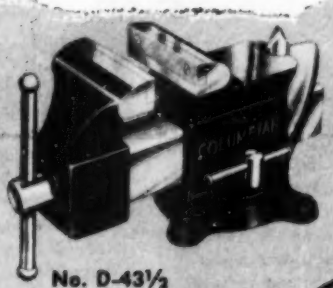
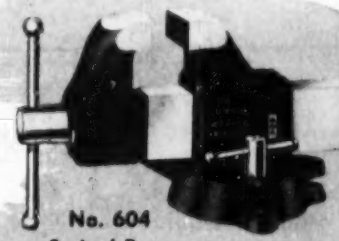
COLUMBIAN VISE
for every need
and purpose—



No. D-43½
Home Workshop
Vise



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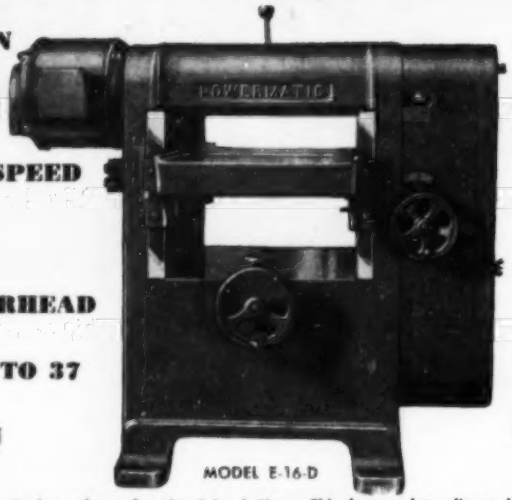
- ALL CAST IRON CONSTRUCTION



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- 3 OR SINGLE PHASE MOTORS
- TABLE LOCKING HANDWHEEL
- DYNAMICALLY BALANCED CUTTERHEAD
- MICROMETER KNIFE SETTING
- DEPTH OF CUT, 1/16" TO 1/2"

Complete with 5 HP 3 phase Motor..$775.00
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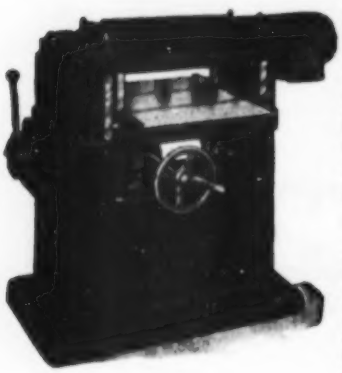

"OLIVERS" FOR SCHOOLS

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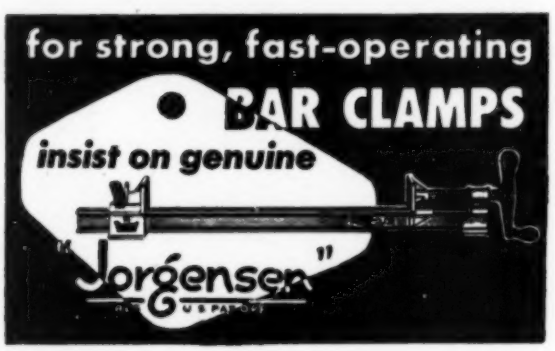
BAR CLAMPS
insist on genuine



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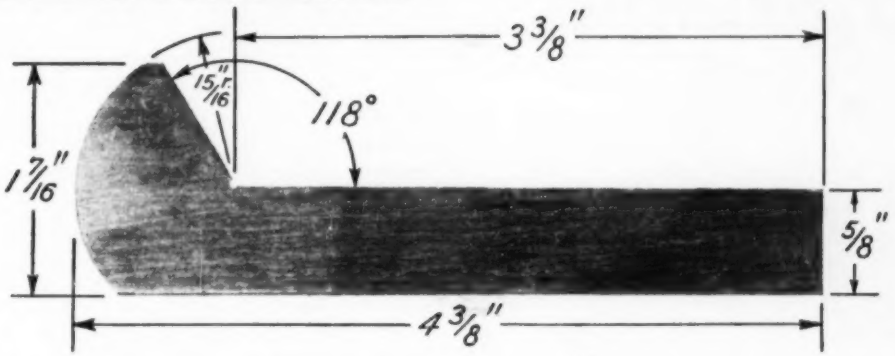
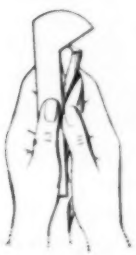
HOW-TO project for the School Shop

—by NICHOLSON FILE COMPANY

NO. 4 OF A SERIES

MAKING A DRILL GAGE



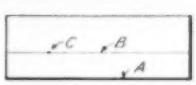


An early precept to the mechanical trainee is that accurate tools are vitally important in turning out accurate work . . . and that accurate-tool maintenance is an essential part of his education. This lesson deals with a standard twist drill for ordinary steel-drilling operations, and the gage for testing the correctness of its point is the project. Longer points, for faster production, are usually used on softer materials; flatter points on harder materials.

Material: One piece Cold Rolled Steel
4 1/2" x 1 3/8" x 1/16".

Tools: Layout dope; scratch-awl; 8" Mill Bastard file; 3" dividers; protractor; surface gage; hack saw; center punch; hammer; No. 60 drill.

SCHEDULE OF OPERATIONS



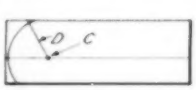
1,2,3,4

1. File edge A straight. Use 8" Mill Bastard file. Check with 6" rule to ensure even light line.

2. Paint surface with layout dope.

3. Set surface gage to 5/8". Place edge A on surface plate and scribe line B.

4. Measure in on line B 1" and make a light center punch mark C.

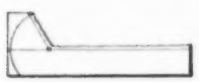


5,6,7

5. Set dividers to 15/16" and scribe arc at point C.

6. Set protractor at 59° or 121° and draw line D.

7. Drill a No. 60 hole on center punch mark C.

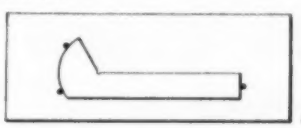


8,9,10

8. Place work in vise with copper jaws and saw gage section with light strokes to avoid bending, leaving at least 1/32" from lines B and D for filing.

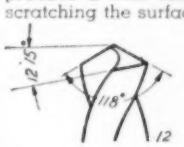
9. File to lines with 8" Mill Bastard file using protractor to check the angle and a 1" micrometer to check between A and B parallelism.

10. Finish file with 8" Mill Bastard file to clean up to the drilled hole. Care should be used to avoid filing hole out of work.



11

11. To finish flat surfaces, tack gage to a block of wood and drawfile with 8" Mill Bastard file, using chalk to produce a finer finish and reduce the possibility of scratching the surface of the work.



12

12. As the included angle of 118° is used for average work, this drill gage is a handy tool for the student to use in grinding drills to that angle.

This reproduction is approximately three-fourths the length of the 8" Mill Bastard file. It is readily available through hardware and industrial supply houses in either Nicholson or Black Diamond brand. Nicholson makes thousands of kinds, cuts and sizes of Regular and Special Purpose, Curved Tooth, Swiss Pattern and Rotary files.

FREE REPRINTS OF THIS PAGE

for school-shop use will be sent to school heads or instructors on individual request. Ask for "How-to Project No. 4" and state minimum number of copies you need. **NOTE** — A small supply of reprints of each of the three preceding projects is also available: **1.** Dovetail Joint; **2.** Tool Bit; **3.** Step Joint. Requests will be filled in the order received and apportioned as quantities on hand permit. State your minimum requirements.

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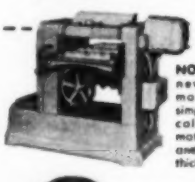

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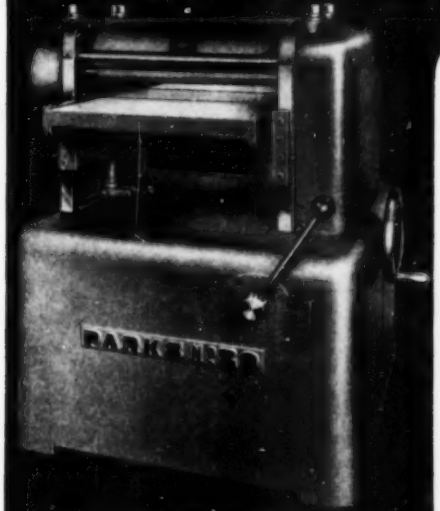

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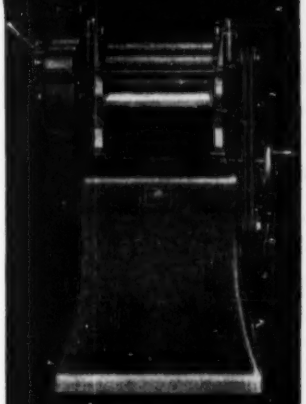

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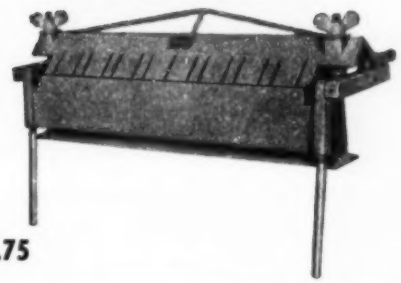

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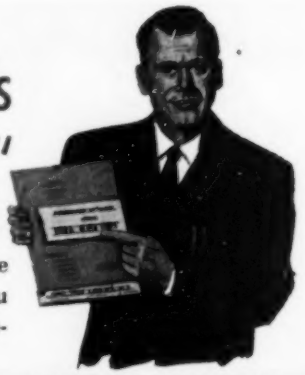

You should have our Booklet No. 205, with the above title . . . *especially* if you are planning a new shop or re-vamping your present one. This booklet will give you valuable suggestions. It offers a shop layout plan and lists fundamental requirements. Fill in the coupon below for prompt attention by us.

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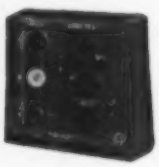

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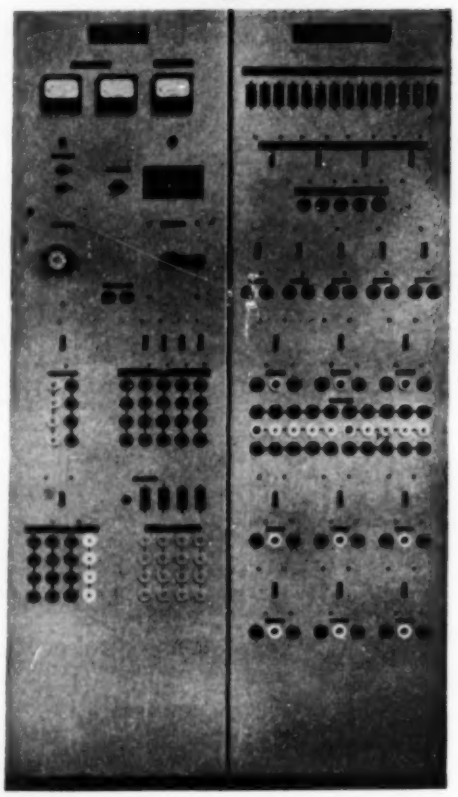

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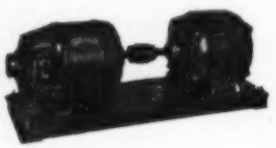
Other types furnished to meet requirements.



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Industrial Arts and Vocational Education
The Shop Teachers' Professional Magazine
DECEMBER 1954

What the Host City Offers in

Adult and Vocational Education in San Francisco

DR. O. D. ADAMS
Assistant Superintendent of Schools
San Francisco, Calif.

City's Cultural Background Is Significant

San Francisco has been well established over the years as a central meeting place for the peoples of the Pacific Coast region comprising the eleven Western states. Centrally located on the shores of the Pacific Ocean has developed it into a world port where the exchange of raw and manufactured products reaches to the far corners of the earth. Gateway to the Orient, it offers an opportunity for the adventure and the romance of travel; provides the excitement of business in faraway places; and through its myriad of world contacts, makes for better understanding of the various cultures of the human race.

The city's geographical location has formed it into the pattern of a cosmopolitan community. On the shores of one of the world's great harbors, it has become an outstanding port in waterborne commerce, and in its "Wall Street" of the West the business of its financial and security market is conducted. Here, too, is well established the distribution point of all types of goods.

A wealth of transportation facilities exists in the network of communication lines which enter San Francisco as represented by railroads, highways, airlines, and an inland waterway system. It is ideally located for both commerce and manufacturing. While thought of generally, as a commercial city, the manufacturing industries have recently developed a larger payroll than any other type of business and indicate that manufacturing has actually grown to be one of the main supporting economic groups in the life of the community.

Concerted community interest in vocational education has persisted in San Francisco for many years. Although sponsored by public spirited individuals, some early private vocational schools were significant in expressing the attitude of many of the citizens of San Francisco. In fact, the inauguration of the Mechanics Institute in San Francisco, which began just one hundred years ago this December, and has continued consistently since that time, marks a century of progress in vocational education in California.

The natural outcome of the amalgamation of all the factors that go to make the city has made for progress. Taking our cue from this fact, it is highly important that any program of education also must be one of progress. The General Electric slogan on its TV Theatre, "Progress Is Our Most Important Product," is exceedingly apt and appropriate as the motive therefor, and as a guide for adult and vocational education in San Francisco.

The great influx of new residents into the state and the city has effected in-

John A. O'Connell Vocational and Technical Institute, San Francisco, Calif.
— Dodge A. Reidy, architect

dividual levels of educational proficiency, but it has in no way altered the desire nor the need for educational advantages. To provide individuals with an opportunity to meet their needs, and to project their ideals into active endeavor, the public schools of San Francisco have created, promoted, and conducted a wide variety of offerings. These are as diverse as will be found in most cities but quite suited to California and San Francisco.

The over-all breadth of interests is as broad as the life of the people, and it is reflected in all the activities that go to make up daily life. That great driving desire of the human soul to progress spiritually, morally, physically, and economically must never be suppressed. It should be nurtured through education.

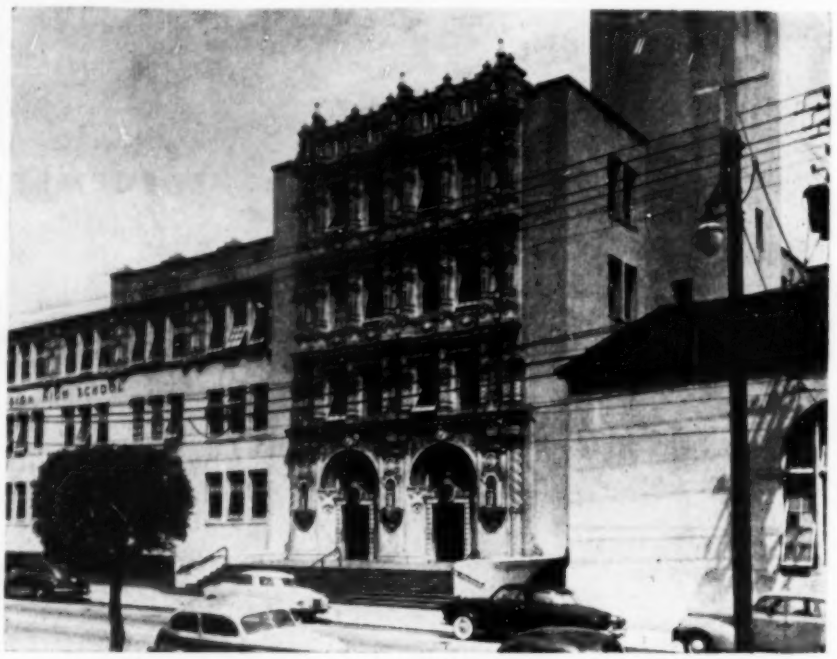
In San Francisco we have striven to give to our program of adult education these characteristics that will meet the broad interests and needs of the people. Any experienced administrator will recognize that the whole program of adult education, whether it be in the area of facility or curriculum, must be organized for flexibility. This means that school departments must be ready to carry on activities of any type which involve a learning situation for adults, or aim to assist them in developing maturity or that provides a realistic approach to vocational education. The schedule must provide for services anywhere in the city and at such times as are convenient for the students.

Flexibility in Administration

To provide the type of organization that will bring about this flexibility of program is the purpose of the present administration. The staff of the adult and vocational education division has the responsibility of program development through instruction, supervision, and co-ordination. Close contact must be maintained between the schools and business and with all cognizant community groups. The proper utilization of these agencies is a necessity since it is expected that they will assist in making the program meaningful to the individual and to the city.

Regulations of the board of education and administrative policies have been set up to encourage the purposes of adult and vocational education. Among these are:

- The organization of classes over a 12-month year.
- The employment of short-term — part-time teachers.
- The employment of full-time teachers.
- The development of hourly pay rates.
- The establishment of teacher availability lists.



Mission High School, San Francisco. Home of Mission Adult School

- The simplification of state credential procedures.
- The adoption of over-all teacher-student attendance ratio 15 to 1 rather than class minimums for attendance.
- The organization of the reporting system by conference with state officials.
- The simplification of local accounting through use of I.B.M. procedures.
- Tuition free instruction.
- Lesson outlines prepared by instructors.
- Trade and job analysis outlines prepared by vocational teachers.
- The encouragement of the liberal use of audio-visual aids.
- Classes located in strategic areas both in and out of school buildings.
- Centralization of vocational and technical classes for better utilization of equipment.
- Centralization of business classes in a full-time adult day school.

There are other types of administrative controls that are planned to simplify the procedures but the foregoing list is perhaps sufficiently illustrative. Budget formulation is based upon conference methods and expenditures kept in line with good business efficiency, keeping in mind that "Progress Is Our Most Important Product."

Organized for Comprehensive Program

The adult and vocational division is organized in two main departments: (1) the adult department and (2) the vocational department. The adult department generally provides for adult classes other than those that apply to distributive and trade and industrial occupational training. The field of operation for the adult school is exceedingly comprehensive and offers classes in Americanization, academic subjects, arts and crafts, business and commercial, homemaking, industrial arts, parent education, classes for the physically handicapped, public welfare and vocational nursing.

One activity in the adult department that requires special mention is the Veterans Counseling Center. Organized as a temporary project shortly after World War II its value to the community and to the public schools, as well as to returned veterans, has continued. The pattern of advisement service provides for the initial interview, the test battery, and the evaluation interview. In addition to the work of the center, some group counseling is provided for nonveterans as another phase of adult education.

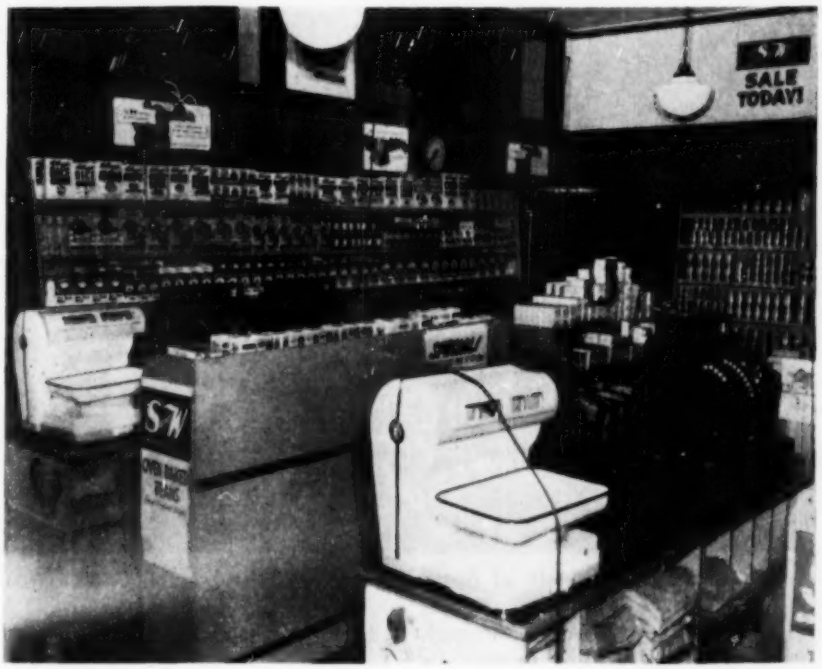
The vocational department conducts classes for both minors and adults. A full-time day school offers a wide range of occupations in the areas of day trade preparatory, and trade extension, preapprentice, apprentice, and in basic academic subjects to meet high school graduation requirements.

Distributive education classes are conducted in conjunction with the senior high schools. They are classified as part-time extension, part-time co-

operative, and part-time preparatory.

The majority of trade extension classes are conducted in the evening school. In San Francisco, the close relationship with advisory committees has made it possible to promote and develop a highly mature trade extension program. Such offerings as teletypesetter, television, synchro motors, production control in addition to special code classes and supermarket sales, will illustrate the maturity of the San Francisco program.

Industrial arts in the San Francisco Plan is under the adult and vocational division. The actual operation, however, is a joint endeavor with the secondary division. The close relationship between industrial arts and vocational education is desirable for a number of reasons. The methods, processes, and skills should be the same. The materials, tools, and equipment are similar. The basic relationship of both to industry, generally, makes it highly desirable that the prevocational and preapprentice objectives be realized. The general educational values, too, are more readily attained in industrial arts when presented from the occupational viewpoint, than when diluted by excessive generalization. The general purpose of industrial arts is to provide an opportunity for students to gain experiences that will give an understanding and appreciation of industrial activities, materials, and processes, and act as an area for occupational exploration. This all can be realized in the San Francisco Plan.



The grocery training store in San Francisco distributive education program

Need for Adult and Vocational Education in San Francisco

No "sure fire" method is known for determining the needs for adult and vocational education. The factors involved are exceedingly complex and make exact prediction impossible. Any human activity as important as those reflected in the programs of adult and vocational education cannot be too exactly forecast and should not be if flexibility is retained. The specialization of occupations into thousands of separate jobs, the kind of environment of the job, the general social, economic, and technological forces that work to change conditions affecting people, their personal abilities, talents, desires and ambitions, and their opportunities for education, further complicate the pattern for the individual. These complicated variables are part of the whole life of the people and must be considered as some of the problems involved in determining needs for adult and vocational education.

Of course, one of the best indications of need for adult and vocational education is represented in the enrollment and attendance figures. Comparing the figures of last year, 65,773 with the total population of San Francisco, 801,000 shows that a ratio of one out of every 12 persons attended our classes in the adult and vocational division.

Other evidence of need may be expressed in the following statements:

In accordance with the Hill Survey,[1] San Francisco has a large adult population — among the largest in the United States.

The cultural background of San Francisco permeates its citizens with the desire for self-improvement. It is believed that the people of San Francisco take an exceptional interest in public affairs.

"People approaching retirement should be provided with facilities to assist them in acquiring skills, hobbies, and recreational interests which will enable them either to be partially self-supporting in old age, or to enjoy full retirement. In addition to partial or full-time employment, and, in anticipation of retirement, there is a continuing social responsibility to provide preparation for a satisfactory old age — in health, housing, recreation, and community life."[2]

There are more persons employed in homemaking than in any other occupation in the state or nation.

Twenty-five per cent of all working women in the United States have children under 18 years of age.

Out of every 100 persons employed in San Francisco approximately 20 work as clerical workers, 15 as operatives, 12 as service workers, 12 as craftsmen, 12 as salesmen, 12 as proprietors or officials, 8 as professionals and semiprofessionals, 6 as laborers, 3 are not reported in the census.

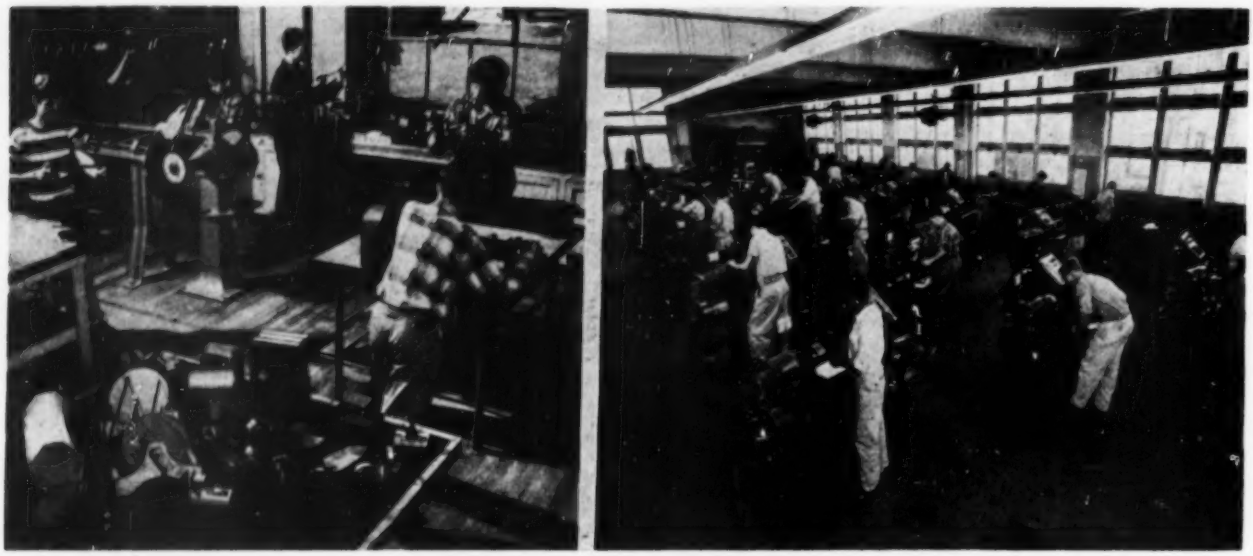
The annual replacements required to maintain the present labor force in San Francisco in all classifications of the United States census is estimated at 17,000. This has been established by Nichols and Williams in their study "A Survey of Employment by Occupation and Industry for San Francisco" and amplified in "A Plan for Vocational Education in San Francisco." It can be further pointed out from the same sources that the total number of apprentices necessary to maintain the required number of journeymen should be approximately 8600.

In one period of 15 months during 1950–51, 14,684 persons were placed by the California Employment Service in San Francisco, almost an average of 1000 placements per month.

A full justification of need is not being attempted in this article but sufficient evidence exists in support of the illustrations given in the foregoing and more detailed supporting data can be found in the United States Census for San Francisco, "A Plan for Vocational Education in San Francisco" by

[1]The Hill Survey for Adult and Vocational Education, published by the San Francisco Unified School District, 1947.

[2]Excerpt from Proceedings of the Governor's Conference on Employment, p. 34, published by California Department of Employment, Sacramento, Calif.



Crafts class at left, at Aptos Junior High School; right, George Washington High School machine shop

O. D. Adams,[3] "A Survey of Employment by Occupation and Industry for San Francisco" by Nichols and Williams, "The Present Situation Relative to Women in Industry," *American Vocational Journal*, May, 1950, by David L. Kaplan, the United States Census, and other sources.

Areas of Operation

1. *Agricultural Education.* San Francisco is generally recognized as a commercial and industrial city, but much of its business activity is based on agriculture. This is particularly true in the sales, distribution, and manufacture of food products. In addition, the city is also an active center for floriculture. Some limited training for floriculture is provided in one senior high school. (Very special attention is given to floriculture in the City College of San Francisco.)

2. *Business and Distributive Education.* Approximately 33 per cent of the total number of employed persons in San Francisco are engaged in business and distributive pursuits. All senior high schools provide for business and commercial training and conduct classes in some areas of distributive education. A full-time day adult business school, numerous evening classes and a typical grocery store are among the organized facilities for business and distributive education.

3. *Home economics.* The increase in women's activity outside the home, with the additional responsibility for maintaining home life, make it mandatory that girls and women have the opportunity to increase their skill and knowledge of homemaking. In San Francisco, homemaking classes are conducted in the junior and senior high schools. In the adult schools, attention is given to all types of homemaking groups. The family life education service is conducted in conjunction with the adult department and offers service to all groups who need parent and family life education classes.

4. *Industrial Arts.* All junior and senior high schools offer industrial arts. It is required of all boys in the seventh grade and elective for students in other high school classes. Approximately 12,000 attend these classes daily. The program has changed emphasis somewhat from the traditional unit shop to a more general approach. One outstanding achievement recently accomplished has been the completion of a safety guide — "Safety in the School" — a comprehensive project developed by the industrial-arts teachers.

5. *Public Service Occupations.* A considerable number of classes operate in conjunction with the adult schools for Civil Service workers, operated mainly for the purpose of preparing applicants for examinations. They are regarded as essential in our educational plan.

6. *Trade and Industrial Education.* In accordance with the United States census, approximately 42 per cent of the total number of employed persons in San Francisco make their living in pursuits represented in the school classification — trade and industrial education. The board of education and the staff have over the past ten years diligently improved the facilities for this type of education. The completion of a modern building and its functional equipment has been a strong motivating force in trade and industrial education. One full-time day school and a large evening school provide for classes in trade and industrial subjects. All local apprentices, under the california plan, are enrolled in both day and evening classes in these two schools. In addition, a cooks and bakers school, and the maritime school operate "off campus."

7. *Training Levels.* Training levels offered by the adult and vocational division are thought of in terms of semiskilled occupations, skilled occupations, technical occupations, semiprofessional and professional levels.

8. *School Levels.* (*a*) *Elementary Schools.* Some continuity of vocational emphasis exists throughout the system, beginning in the elementary grades. Usually this takes the form of acquainting the children with the work of various people in the community, such as the grocer, the delivery man, the doctor, and other occupations. The elementary schools utilize booklets on local subjects, one of which is about the workers of San Francisco. Also, considerable work is done in the fourth grade on the economic background of California.

b) *Junior High Schools.* The industrial age in which we live makes it essential that some understanding of materials, tools, machines, and processes become part of the life of growing youth. The industrial arts aim to bring this about as well as to provide an outlet for experimentation in construction and to learn the use of tools and equipment, and as a means of guidance toward future occupations. Every junior high school in San Francisco is well equipped to provide for these objectives.

c) *Senior High Schools.* The senior high schools of San Francisco are

[3] Orville Daniel Adams, published by Stanford University of California, 1952 (Dissertation).

gradually approaching the comprehensive type. Here youth may obtain general experiences to acquaint them with the world of work and to explore occupational fields. At the same time, through motivated industrial arts and homemaking, basic physics, chemistry and applied science they may find an opportunity for some early specific work toward the choice of an occupation. In some instances this training applies directly to many other skilled, semiprofessional, and professional vocations.

d) Vocational and Technical Schools. Schools are conducted in San Francisco to meet the vocational needs in the basic trades and to provide for a limited number of technical classes. Practical shop instruction, as well as related and supplementary subjects are offered in various types of schools.

e) Adult Schools. Courses in the adult school are offered on the elementary, secondary, and vocational level and provide for all types of instruction to meet general and specific objectives.

f) Special Mention Areas. To further meet the adult and vocational needs of the citizens of San Francisco the board of education provides courses in technical and semiprofessional areas at the City College of San Francisco. Its nationally recognized hotel and restaurant program leads to placement in hotels, restaurants, baking, or allied industries.

The John A. O'Connell Vocational High School and Technical Institute has the distinction of operating the first FM Educational Station built in the United States. It has been on the air since 1940. Known as KALW, it is now housed in a permanent and functional studio. The school also has a complete television studio utilized by KQED for educational programs. The expenditure of approximately $250,000 in equipment makes this an outstanding unit for training.

As the time of the San Francisco American Vocational Association Convention approaches we hope the delegates and members will avail themselves of the opportunity to visit some of the schools in and around the Bay Area.

We salute you and extend a most hearty welcome.

What the Host City Offers in

Industrial Arts in San Francisco

JESS E. RATHBUN
Co-ordinator of Industrial Arts
San Francisco Unified School District
San Francisco, Calif.

Industrial arts in San Francisco is experiencing a definite transition. This is particularly true on the junior high school level. The acceleration of the building program necessitated by the increased enrollment is hastening this transition because it makes possible the installations to meet the needs of the new program.

In anticipation of a building program which included four and possibly five new junior high schools, a committee was formed in 1949 to study the facilities needed in terms of numbers and kinds of rooms and laboratories for a junior high school of twelve hundred pupils. Recommendations for industrial arts were: one comprehensive woodshop; one comprehensive metal shop; one graphic arts shop; one mechanical drawing unit; and two craft shops.

This represents a radical departure from the traditional industrial-arts program in San Francisco. The program by tradition and by practice had been a highly departmentalized unit shop organization which included machine shop, sheet metal, woodwork, electricity, graphic arts and mechanical drawing.

One year of industrial arts is required for all boys in the seventh grade. Traditionally the low-seventh grade boys were assigned to bench woodwork and the high seventh to sheet metal. Beyond the seventh grade, through the junior and senior high schools, industrial arts is offered on a purely elective basis. In the new program, low-seventh grade *boys* and *girls* are assigned together to a course in home arts. The two craft shops which were recommended by the 1949 committee develloped into well-equipped combination home living, home mechanics, and craft shops.

Poster contest winner at the annual safety fair sponsored jointly by industrial arts and vocational education

The emphasis for these low-seventh grade boys and girls is on a broad home living or home-arts program which includes home mechanics, and a broad craft program which includes several major craft and hobby areas, such as, wood, metal, plastics, gardening, home painting and decorating, leather, lapidary, photography, and related areas. In the high-seventh grade, the girls are scheduled to a general homemaking course and the boys to an industrial-arts program which may be in one of the other shops or it may be a more advanced version of the craft activities touched upon in the low seventh.

The new home-arts courses are in-

At left, high school radio and electricity; and at right, sterilizing eye protective equipment is a part of the industrial-arts instructional program

tended to accomplish several specific objectives. These courses will be of a broader exploratory nature. We tend to give lip service to the important objective of exploratory experiences and then, in actual practice, limit the experiences to relatively few, established largely by tradition. Exploratory experiences locally have consisted of those in unit shop wood and sheet metal. As valuable as wood and sheet-metal experiences are, there is nothing sacred about them and they by no means represent broad exploration. The value of industrial-arts experiences for girls tends to receive more theoretical support than actual practice indicates. The only way to justify scheduling girls to the program is to provide suitable experiences for them. The broader courses will also develop skills and insight which are never touched upon in the traditional unit shop courses. The seventh grade pupils have little or no choice relative to the shop courses in which they find themselves. It is hoped that individual interests and needs will be more adequately met in the new course.

The home-arts course is on an experimental basis. If certain aspects of it prove to be of little value in terms of the established purposes, deletions may be made without hesitation. There is no course outline at present. Any instructional guide will be developed as a result of experience over a sufficient period of time to evaluate the program. The home-arts course is not a home mechanics, handicraft, or a strictly craft program. While it may touch upon each of these areas, it is supposed to be much broader and cut across departmental lines in many places.

The elective offerings in the new junior high school program are metal, wood, graphic arts, and mechanical drawing with the possibility of crafts, electricity, and home arts when the demand arises. Present offerings in the traditionally equipped junior high schools are, in addition to required woodshop and sheet metal, machine shop, woodwork, graphic arts, mechani-

At left, planning area and open tool panel in junior high school woodshop; and at right, bookbinding in the graphic arts program

At left, high school machine shop; and at right, exploratory graphic arts

cal drawing, and electricity in a strictly unit shop program.

There is no industrial-arts program on the elementary school level except in the few schools which still have the seventh and eighth grades, and the schools for handicapped children. These schools have a woodwork program adapted to the needs of the children in each situation. Theoretically the needs of the first six grades in this area are met by the general-arts program.

The high school industrial-arts program is the traditional unit shop organization which includes machine shop, woodwork, auto mechanics, radio and electricity, mechanical drawing, and, in a few schools, elementary graphic arts. There is no required industrial arts in the high school program; however, a student may select this area as his major interest field. Three years of study in a major interest field, sometimes referred to as a high school major, is a local graduation requirement.

San Francisco, along with many other systems, is faced with the problem of permitting students to spend the entire three years in one shop or recommending a broad base of industrial-arts experiences which would include several unit shop offerings. For example, at one time in the not too distant past, a high school permitted a student to spend all of his industrial-arts time in the auto shop. Thus, as a result, the student would graduate with an *industrial-arts major* consisting of 6 semesters of auto shop.

There are hints of some legal implications relative to the authority of the schools to require a pattern of courses within the student's field of concentration; however, an attempt has been made to set up recommendations within the individual schools tailored to meet the needs of the immediate situation. For example, one high school has strongly recommended eight semesters of industrial arts which is two more than required for graduation. The eight semesters should include two of mechanical drawing, at least one in each of three areas, and a total of four in one subject. Another high school requires a sequence of courses with one semester of each of the following in this order: woodwork, machine shop, electricity, and auto shop with two years of mechanical drawing, beginning with the first semester.

There might be legitimate concern for the advanced student who definitely had decided to enter the trade. Fortunately, in San Francisco, there is a trade school with adequate facilities in most areas to meet the needs of all the trade-bound students. This fact tends to de-emphasize the trade training objectives in the industrial-arts program; thus making it an integral part of general education in practice as well as in theory.

San Francisco has seven high schools offering rather complete industrial-arts programs and one so-called academic high school with no industrial arts other than mechanical drawing. There are 13 junior high schools all of which have one year of required industrial arts for all boys and an elective program for eighth- and ninth-grade students. The total enrollment in the industrial-arts classes is approximately 12,000.

The budget procedure may be of some general interest since it is based on an annual per pupil allotment. Several years ago all departmental instructional supply budgets were discontinued and a per pupil cost was established after considerable research covering several years. At present the annual per pupil cost for industrial-arts classes, other than mechanical drawing, is $6.66 in junior high schools and $7.10 in senior high schools. These figures are revised upward or downward annually to keep pace with the trend in cost of supplies.

Maintenance of the small tool inventory is included in the instructional supply budget; thus it is unnecessary to maintain a small tool replacement budget. The instructional supply budget is assigned to the individual school principal; thus placing the control close to the need. The result is that the teacher is aware of how much he may spend for the school year. This makes it possible to give emphasis to points of greatest need in the instructional program. Purchases are subject to departmental approval for suitability for instructional purposes, but there is no budgetary concern on the departmental administrative level. The replacement budget is established annually on the basis of need.

San Francisco has enjoyed strong support for its educational program and this certainly has been true in the area of industrial arts. The best of housing and equipment is provided. The ever present challenge is to maintain an instructional program in terms of providing experiences which meet the needs of the students it serves.

Regulating brightness of fluorescent lamps by simple method was developed by General Electric. System operates on new adaptation of old lighting principle employing electrical control device in combination with special, rapid-start ballast. Method is expected to find widespread use in homes, stores, schools, and offices. — *Industrial Research Newsletter.*

Important Information as to

Sheet Sizes, Numbering, and Filing of Working Drawings

H. D. CAMPBELL

J. Sterling Morton High School
Cicero, Ill.

Acquaintance with the numbering and filing practices of industrial drafting rooms helps one to understand but does not solve the problem of keeping track of layouts and tracings in the school drafting rooms or of blueprints in the shops.

Industrial numbering practices are generally based upon the filing of tracings in numerical order according to sheet size, each detail being drawn upon a separate sheet. Toolroom drawings often have a separate series of drawing numbers, as do standard parts. There may be a series of pattern numbers which have no direct connection with the numbers of the drawings from which the patterns are made. A set of blueprints, therefore, may be made from tracings whose numbers have little or no obvious connection with one another.

In a well-ordered drafting room, the relationship of all these numbers is kept clear on files administered by a clerk and made understandable, usually, by combined drawing and material specification sheets.

On the other hand, in some drafting rooms a complete knowledge of the secrets of the filing system is carried in the head of the chief engineer, chief draftsman, or of some ancient draftsman. Should an accident happen to the custodian, a divining rod or crystal ball would be needed to unearth tracings filed but a few months before.

The drafting instructor who has worked in efficiently supervised industrial drafting rooms is faced with the problem of whether to adopt the system he liked best or to devise one particularly for the school drafting room in which he is to play the roles of chief engineer and chief draftsman. Human nature being what it is, the probabilities are that he will decide to adopt the best industrial system he knows rather than to question its applicability to the school situation. He will start his card files and, after a few unhappy experiences with student file clerks, will take over the filing himself. If he teaches primarily by the *plate* method, he may find time to carry on this chore along with all the rest of his duties, at least until his enthusiasm wanes. If, on the other hand, he teaches vocational drafting by the *production* method — the drawing of anything requested by the other shop teachers as need is found for equipment, tools, and machines — he will find himself too busy to operate or supervise the operation of the industrial system which he has adopted. He will soon be in the market for a simpler system which his students can understand and operate with a minimum of supervision.

The purpose of this paper is to describe an efficient system of numbering and filing which is being used in a school drafting room.

The basis of this system is the job number, rather than the sheet number. This is the next open number in a book of job names and numbers. All tracings belonging to any given job carry this number. To it is added a decimal point followed by a number to indicate sheet size and a dash followed by a figure or a letter to indicate what kind of drawing or other information the sheet carries. All standard size tracings are placed in a job envelope identified by the job name and number and filed in the *unfinished* or *active finished* drawers of a filing cabinet or in the *dead* file, the repository of jobs which will seldom or never be used again. Tracings too large for the envelope are stored in numerical order in large *active* or *dead* drawers in a file.

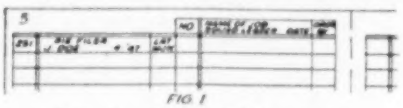



FIG 1

Fig. 1. Book of job names and numbers

In order to describe this system in detail, let us start with the book of job names and numbers, part of a page of which is shown in Figure 1. Let us suppose that the student squad leader in charge of the design and drawing of a die filer is ready to start numbering his layout and tracings.

He finds 251 to be the next open number in the book. He letters in the name of the job, his name, and the initials of the shop teacher(s) ordering the job. When the job is finished, he adds the date of its completion. (In Figure 1, the extension of the right hand column on page 5 is a guide to be followed by the draftsman using the first open number on the page.)

The layout is numbered 251.0–L: 251 being the job number, .0 the sheet size, and "L" to indicate "layout." The main detail (body casting) is numbered 251.4–1, and the pattern number is given on the detail drawing and on the pattern as 251–1. (The sheet size is omitted from the pattern number since it has no value to the patternmaker.) Other details, for example, are numbered 251.4–2, 251.2–3, 251.1–4. The .1 in detail number 4 refers to a small part drawn on the unit size sheet (8½ by 11); the .2 in detail number 3 refers to a sheet twice as large; and the .4 in detail number 2 refers to a sheet four times the unit size. The general assembly drawing is numbered 251.0–A: 251 for the job number, .0 for the sheet size, and letter "A" to suggest "assembly." If there are subassemblies, as is most probable, they will be numbered 251.2–B, 251.1–C, etc. A wiring diagram would be similarly lettered, as 251.1–D, and the drawing and material list might appear as 251.1–E.

To summarize, the numbers of typical drawings of the die filer might be as follows:

Layout	251.0-L
Detail, main casting	251.4-1
(Pattern number of casting)	251-1
Detail	251.4-2
Detail	251.2-3
Detail	251.1-4

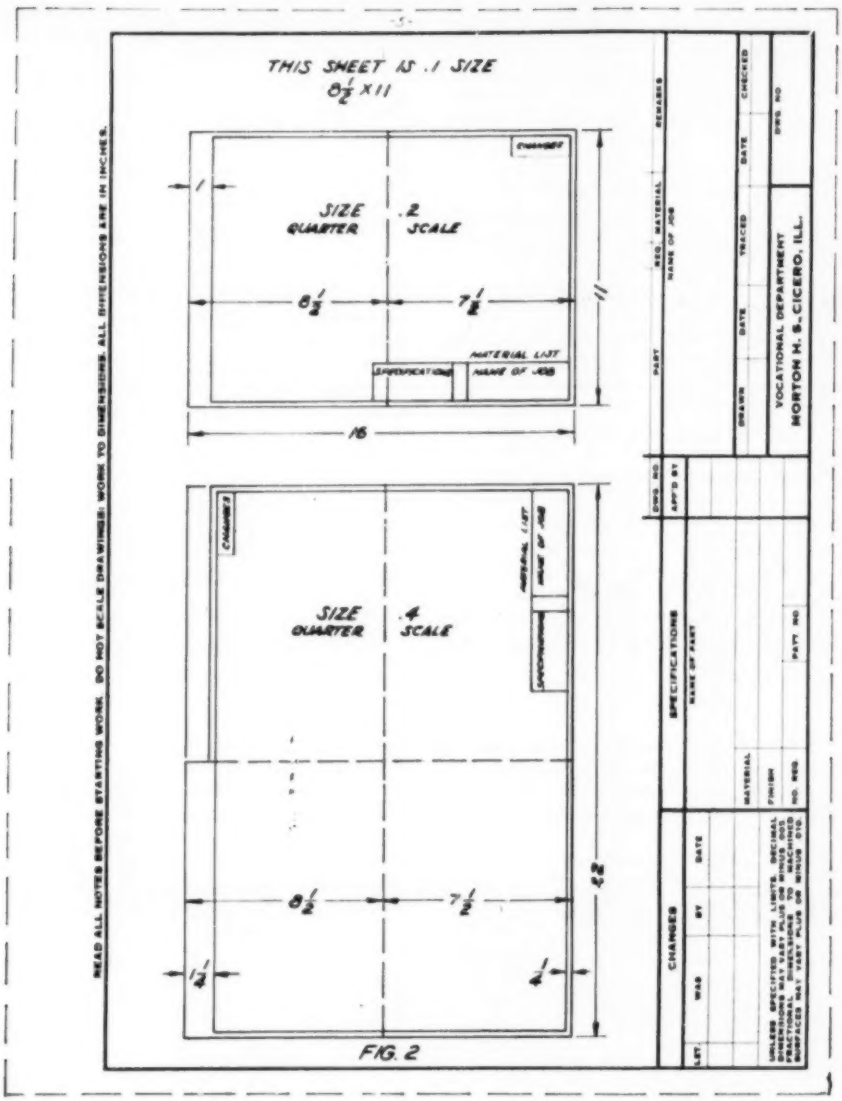

THIS SHEET AS .1 SIZE
8½ X 11
SIZE QUARTER .2 SCALE
SIZE QUARTER .4 SCALE
MATERIAL LIST
SPECIFICATIONS
NAME OF JOB
CHANGES
VOCATIONAL DEPARTMENT
MORTON H. S. CICERO, ILL.
READ ALL NOTES BEFORE STARTING WORK. DO NOT SCALE DRAWINGS. WORK TO DIMENSIONS. ALL DIMENSIONS ARE IN INCHES.
FIG. 2

Fig. 2. Drawing sheet size .1. Also dimensions for sheets .2 and .4

General assembly	251.0-A
Subassembly	251.2-B
Subassembly	251.1-C
Wiring diagram	251.1-D
Material and drawing list	251.1-E

Referring back to the layout, it should be said that this .0 size untraced drawing is filed in the job envelope after it has served its purpose. This is done by folding the sheet to fit the envelope — something which should never be done with a tracing. The squad leader designer should be cautioned to have all foreseeable changes made on the layout and to have it approved and initialed by the teacher ordering the job and by the pattern-maker, foundryman, welder, machinist, electrician, etc., before proceeding with detailing. After the completed job has been tested and accepted, the layout is destroyed.

Reference has been made to .1, .2, .4, and .0 size sheets. According to the American Standards Association's national standard of Drawings and Drafting Room Practice (Z14–'46), the basic sheet size is 8½ by 11 inches and the larger sheets are multiples thereof. This writer has found it best to modify slightly the multiple size sheets as given in the ASA standard. Experience with school shops has demonstrated that a master set of blueprints folded and bound into a book should be sent to the teacher in charge of the shop making the project, followed by loose sheets as needed by the student workmen. The 11 by 17 and 17 by 22 ASA sheets cannot be folded *and bound* to make an 8½ by 11 book, but the 11 by 16 and 16 by 22 sizes shown in Figure 2 and the larger sizes shown in Figures 3 and 4 can be unfolded and laid flat and refolded again and again without difficulty or damage.

The three sizes shown in Figure 2 are carried in stock. They have border lines, title block, specification block, change column, etc., printed upon them as is customary in industrial practice.

All sheets larger than the .4 sheet are cut from the roll, laid out, and lettered by hand. Figure 3 shows the basic plan for laying out these .0 size sheets. Figure 4 illustrates some commonly used sizes. In folding and stapling into a book, one or two inch wide strips must be cut from the .4 and .0 sheets. These strips are not removed if prints are to be sent to the shops unbound.

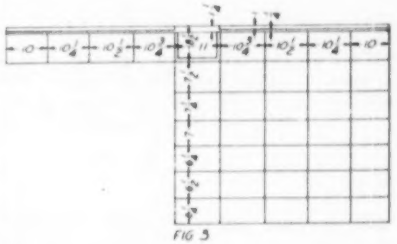


FIG 3

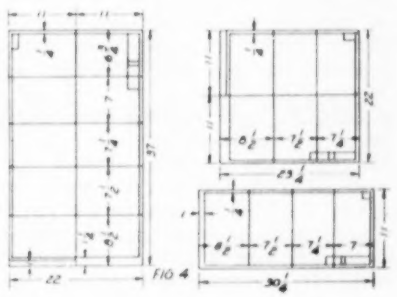


FIG 4

The border lines are drawn in pencil or ink; the title block is located in the lower right hand corner when reading the drawing. The binding margin should be as nearly as possible in the center of one side. The dimension marked (*) in Figure 3 should be eleven inches *when there is but one horizontal fold* as illustrated in Figure 4.

The .1, .2, and .4 tracings are filed *in numerical order* by size in large job envelopes together with the folded layout and all computations, sketches, data, etc. These envelopes are made from heavy layout or butchers' paper. After folding the envelope, the name and number of the job is lettered in ink on the outer flaps, as shown in Figure 5. Some jobs can be drawn using only .1 and .2 size sheets; Figure 6 gives the information needed to make small job envelopes.

In order to co-ordinate all information in a set of blueprints, a material

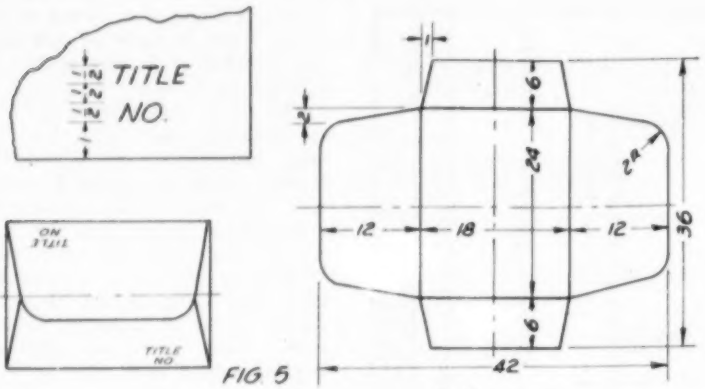


FIG. 5

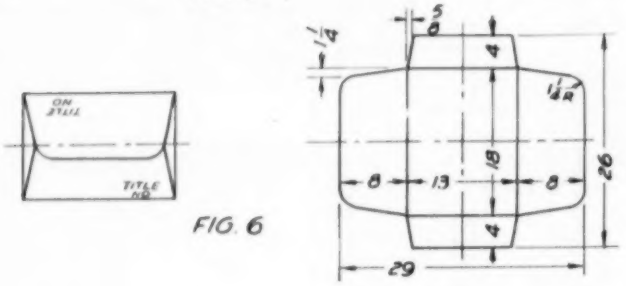


FIG. 6

and drawing list is essential. This list is drawn on a standard sheet with the horizontally ruled lines one quarter of an inch (or more) apart and the vertically ruled lines drawn from points indicated on the printed sheet. See Figure 2.

Each line contains the drawing number of the individual part, the name of the part, the number required, the material used, and any necessary remarks. The list reads from bottom to top in order to make possible subsequent additions, if needed. The general assembly, subassemblies, wiring diagram, material and drawing list, layout, cast parts, weldments, fabricated parts, and purchased parts are listed in that order.

Some parts do not need to be detailed but can be made from information given only in the material list. Straight pins and shafts, for example, can be described by diameter and length, plus chamfer.

For any part that is purchased, the manufacturer's name and the catalogue part number should be given. If more information is necessary and room is not available, the draftsman should letter "see note" in the remarks and give the full information elsewhere on the sheet.

Very often a part of a new product is identical with one in a previous job. In industry such standard parts appear continually in material and drawing lists. Even in school drafting, it is better to follow this practice than to redraw knobs, handles, couplings, etc. A note in the remarks column gives the number of the previous drawing.

From the material and drawing list one can tell: the total number of parts in the job, how many must be made, how many will be purchased, the number of blueprints needed, their size and, consequently, where to find the tracings. The numbers below refer to the various uses of the material and drawing list as illustrated by Figure 7.

Number (1) in Figure 7 gives the job number, the sheet size, and the letter symbol of the material and drawing list.

Number (2) illustrates that the name of a job should be explicit enough to differentiate between various models of the same type.

Number (3) shows that the general assembly is on a .0 size sheet.

Number (4) lists a subassembly drawn on a .4 size sheet.

Number (5) is a wiring diagram drawn on a .1 size sheet.

Number (6) is the material and drawing list which appears, in a much abbreviated form, in Figure 7.

Number (7) shows that the layout is on a .0 size sheet.

Number (8) is the first detail, a casting, which has been previously drawn and patterned for a ¾ h.p. motor No. 1 and will be re-used in this model.

Numbers (9) and (10) are details.

Number (11) is a part for which there is no detail drawing. Because of its simplicity, it is made from the information given only on the material and drawing list.

Number (12) is a typical stock part. The remarks column gives enough information to enable it to be bought.

(14)	NOTE #1 NEW DEPARTURE CO., 17TH EDITION, #5205					
(13)	-41	BALL BEARING	2		SEE NOTE #1	
(12)	-38	MACH SCR, FIL HD	4	ST	#10-24 NC-1/2	
(11)	-24	ROTOR ROD	33	COP	.190 D × 2 1/2 LONG, 1/16 × 45° CHAMFER BOTH ENDS	
(10)	2-7	SHAFT	1	CAST		
(9)	1-4	RH BEARING CAP	1	CI		
(8)	.4-1	FIELD SHELL	2	CI	USE 5414-1	
(7)	0-L	LAYOUT				
(6)	1-D	MAT'L & DRG LIST				
(5)	1-0	WIRING DIAGRAM				
(4)	4-B	STATOR SUB-ASSY				
(3)	0-A	GENL ASSEMBLY				

APPD BY (2) ¾ HP MOTOR #2
3 PHASE, BALL BRG, 1120 RPM
DRAWN | DATE | TRACED | DATE | CHECKED
EDUCATIONAL DEPARTMENT MORTON H.S. CICERO, ILL. (1) DRG. NO. 5681-D

FIG. 7

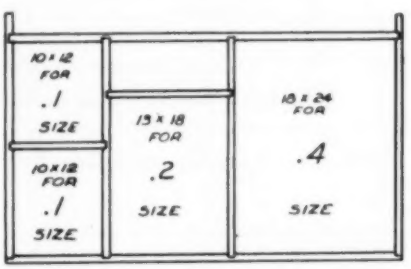


FIG. 9

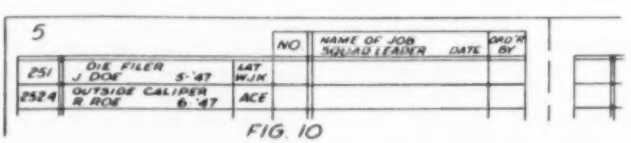


FIG. 10

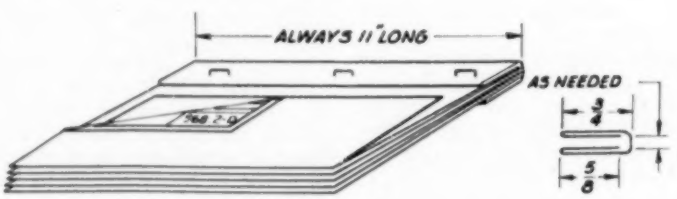


FIG. 8

There is no drawing for any purchased part which is used without modification.

Number (13) shows what is done when there is not enough room in the remarks column to give full information regarding a purchased part. "See Note No. 1" is lettered in, and the note (14) found elsewhere gives all needed information.

In the book of blueprints, the assembly is always placed last because it is usually a large sheet. If it came first, difficulty would be encountered in reading the details, most of which are drawn on small sheets and consequently would be hidden under the unfolded assembly with which the details will continually be compared.

From the bottom of the book up, the general assembly, subassemblies, and wiring diagram (if any) are placed in alphabetical order. The material list is always the uppermost sheet. Below the material list, the details follow downward in numerical order.

The drawing number on .1 size blueprints is always visible in the lower right hand corner of the book. See Figure 2. The corner containing the number on .2, .4, and .0 size sheets should be folded back so that the number is visible. See Figure 8.

The book is stapled along the binding margin. To prevent the first and last blueprints from tearing off, the staples should be put through a binding strip made of heavy paper such as is used for the envelopes. See Figure 8.

Many jobs such as tools, jigs, and fixtures are drawn complete on a single sheet of tracing paper. It would be a waste of time and material to store them in job envelopes; therefore they are filed by size and numerically by job numbers in a specially compartmented "miscellaneous" drawer, shown in Figure 9.

In entering the data for these single-sheet jobs in the book of job names and numbers, a slight variant in the procedure shown in Figure 1 is necessary. Here the job number *must include the sheet size* in order to distinguish it from a multi-sheet set of drawings filed in an envelope, and to facilitate finding the tracing in the miscellaneous drawer. This is illustrated in Figure 10 where an outside caliper with details, assembly and material list is shown as having been drawn on one .4 size sheet. It is given number 252.4 with all other information the same as for job 251.

To recapitulate the information given in regard to the book of job names and numbers, the following is quoted from the instructions lettered on our book's front cover:

1 — For a job requiring many tracings filed in a job envelope, take the next unused number, give the name of the job, name of the squad leader, and the initials of the teacher (s) ordering the job. When the job is completed, add the date of completion.

2 — For a job complete on one sheet and filed in the "miscellaneous" drawer, take the next number *and specify the sheet size*, give the name of the job, the name of the squad leader, the date of completion, and the initials of the teacher(s) ordering the job.

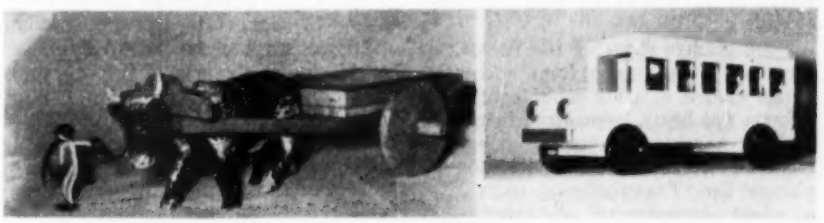
An Important Step

Helping Elementary School Teachers Work With Wood

MARY-MARGARET SCOBEY
Stanford University
School of Education
Stanford, Calif.

Industrial arts is gaining importance and popularity as a phase of teacher education and in-service education programs for elementary teachers. For many years educators have known that manipulative activities enrich a curriculum and make it more meaningful. Those activities concerned with experimentation, observation, and study of the tools and processes which man has devised to change raw materials for his use are especially adaptable to modern ideas of a broad curriculum design, but one weakness of such a program is the lack of trained teachers for the job.

Children need to understand the basic principles of industrial processes to appreciate our rapidly changing scientific-technological culture. Such learning is made more meaningful when children are confronted with authentic problems, or the *doing* processes of a specific culture or historical era. Not only do children gain academic knowledge and practical understanding of a process, tool or material, but industrial-arts activities also help develop skills of planning, evaluation, co-operative thinking, and problem solving. Children can also develop social skills as working together in groups, sharing tools and materials, and respecting the work and ideas of others. Such a program cannot be effective unless young teachers are given opportunities to experience certain industrial-arts activities for



Transportation models. At left — two wheeled cart, South American unit; at right — a school bus in the community or school unit

Transportation models. At left — merchant ship and long boat in the early California unit; at right — trains in a dramatic play set-up. Teachers working. At left — painting; at right — finishing a house

themselves and experiment with the methods of teaching involved in them.

One of the most popular phases of the industrial-arts program is wood construction. Good elementary school teachers have for years guided children in construction activities with wood because they know through these experiences understandings are enriched and concepts enlarged. According to the best thinking of educators, construction of small wooden models is not a separate end-result activity. Usually the need for a boat or train will arise from a previous group experience; the construction activity is best used as an outgrowth of something that has happened before. Then after the boat or train is made, it is not set on a shelf to be observed. It is used in a *dramatic play* situation to help children learn why man needs that kind of transportation, and very frequently the use of the model will lead to further research or activity. For example, in a farm unit the farmer needed a flat-bed truck to gather hay for the cows. A boy made the truck, found that stakes could be added to use the truck for other work, that roads were needed, and that a garage was also needed to house the truck.

In a second grade studying the farm, wood construction activities might include a farm house from orange crates, a barn from apple boxes, furniture, stanchions, trucks, tractors, silos, and other farm equipment. These articles are used in dramatic play so that learnings about farm life and the responsibilities of the farmer are reinforced and extended.

Fifth graders studying the Westward Movement may make from authentic design models of a log cabin, conestoga wagons, flat boats, looms, trenchers, and perhaps a stage-set type log cabin to make a setting for the dramatization of pioneer life. Transportation units give excellent opportunity at almost all grade levels for the construction of models of various types of trains, trucks, boats, and airplanes. To supplement the use of these small models, children will also construct stations, warehouses, harbors, and the buildings of an airport with boxes or scraps of wood.

There seem to be three reasons why teachers do not provide more of the industrial-arts activities with wood. In the first place, the teacher may not understand the use of tools or may not have acquired any skill with them. Of course a teacher would not ask a child to use a miter-box if she does not know its use herself! Second, teachers are not sure of the specific classroom organization necessary to an industrial-arts work period. The thought of children working noisily with tools and materials is confusing to those who have not thought through the necessary organization of such a period. And third, many teachers are not able to anticipate, visualize, or plan for the many types of activities which are appropriate to curricular themes or developmental levels.

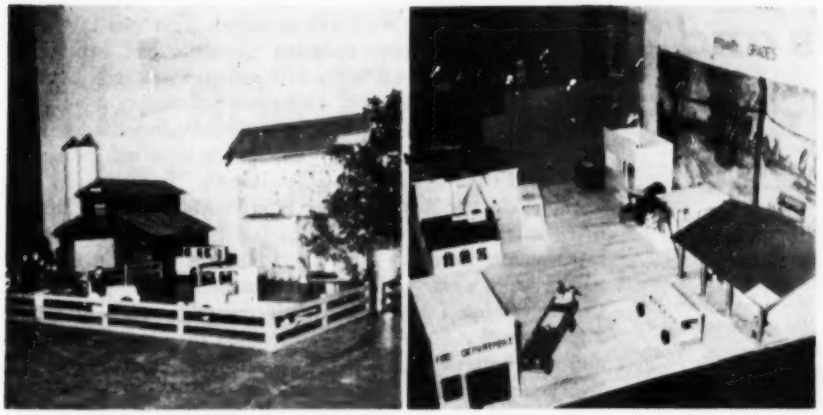
One way to help young teachers gain security in these three problems is to provide opportunities for teachers to use hand tools, operate in an organized work period, and produce the kind of wood projects children would need for various curriculum units. The procedure should be similar to that used by children: planning, using tools, gathering materials, evaluating work.

A student first needs to design a plan for the project he will construct of wood. From observation of real trucks or from looking at pictures or a model, he can sketch a picture of the truck he wishes to make. He will be specific about the shape of the hood, the number of wheels, the size of the cab, and other details such as headlights, bumpers, windows. While planning the truck he will decide the length and width of each piece. He will think through the process of construction: which piece is needed first, and in what order other pieces are attached for the effective assembly of the parts. For example, one would not leave off the steering wheel until after the top of the cab is in place.

After careful design and anticipation of the steps of construction, a student will need specific instruction in the use of the carpenter's hand tools necessary to the operation. Usually the tools the student teacher uses are the same as those children will use in the elementary school. Adults can usually be taught by a complete demonstration of all the tools, followed by individual or small-group instruction during the actual working period. The teachers should understand, however, that children usually do not learn about tools that way. Instead, a teacher demonstrates a tool or two at a time, as the tools actually are used in the classroom, or as a child or group of children need to know about such tools as the brace and bit or the try square.

It is surprising how many young teachers, particularly the women, have not used common hand tools. They do not know how to balance a hammer or use a saw with sure, easy strokes. Such details as learning to hit the nail squarely on the head with the flat of the hammer face must be a conscious learning for many students. Most women will make hard work of the sawing, rather than loosening the grip on the handle and letting the saw do the cutting. The use of the miter-box and the try square, so important in fashioning pieces that fit, can only be mastered by using them. Frequently one finds a student holding the try square with the handle at an angle to the piece of wood rather than held firmly against it. The importance of the clamp and how to clamp a piece of wood without marring it is another simple procedure which most students must learn. The correct size and kind of nail, the use of glue, sandpapering, and painting techniques must also be experienced. And as they learn how to use these tools, teachers need to know that children will face almost the same problems.

In organizing the college laboratory class, the instructor can help the stu-



The dramatic play set-up. At left – the farm; at right – the community

dents visualize elementary classroom procedure by following the general scheme of the elementary school work period: planning, working, cleanup, and evaluation. The hour usually opens with a short planning and demonstration period in which it is ascertained that all students know what they are to do, have materials with which to work, or know where the materials they need are stored in the laboratory. The work period follows, in which each student or group of students proceed with the work. During this time a variety of activities may be going on, from the preparation of a plan design to the final stages of painting or otherwise finishing a project. In relating this to classroom procedure, students learn that not all children in a class need to be working with hammer and saw at the same time. Some may even be weaving or working with clay. Before cleanup period, a warning is given to prepare the workers for the close of the period. Then the cleanup period is a time when all participate in putting away tools, sweeping, and performing other housekeeping activities. Sometimes certain monitors have the responsibility of checking specific areas to see that all is in order.

The evaluation of the college laboratory period becomes a demonstration of several teaching techniques. In the first place, the instructor portrays the role of the teacher in pointing up and helping to solve problems, share ideas, and demonstrate skills. During the work period, the teacher takes note of the problems which need to be considered during evaluation. Sometimes individual or group problems need to be solved immediately, during the work period; others can wait for the consideration of the total group. If a problem has been solved, a discussion of it in evaluation period is often helpful to others in avoiding the situation or in knowing how a similar difficult[y] be handled. Second, the students evaluate and appreciate each other's w[ork] and co-operate in the solution of construction problems. Frequently students will not see the work of some of their classmates if this opportunity for "showing and telling" is not used. Third, the evaluation period is a natural place for consideration of safety factors involved in the use of tools by children. Some tools are not safe for younger children, whereas other tools need careful supervision. Fourth, through evaluation, discussion can be made of the practical problems a teacher faces when guiding children in construction activities. Fifth, while reviewing the work of each individual or group, teachers can consider the various kinds of wood construction projects appropriate to specific developmental levels and curricular themes of the elementary school. The projects made in class may be the beginning of the thinking done about other activities which are related to the project and appropriate to that unit.

If pre-service and professional teachers can be given experiences similar to those mentioned here, they will feel more secure in providing such activities for children. The use of wood, as one phase of industrial arts, gives children an opportunity to *learn by doing*, to develop skills necessary to a satisfactory personal life, and to contribute to a better understanding of and appreciation for our industrial culture.

Sources of Wood: lumberyards — scraps; cabinet shops — scraps and milled lumber; grocery stores — apple and orange boxes; liquor stores — wooden boxes; community construction projects — scraps.

Popular Sizes of Wood: finished four sides, soft pine preferrably; 4 by 4 in., 2 by 4 in., 1 by 1 in., ¾ by 4 in., ½ by 4 in., ¼ by 4 in., ½ by ½ in., ½ by ¼ in.

For primary grades the teacher may wish to have the lumber ripped to uniformed sizes. The custodian can usually help in this task, and frequently the high school woodworking shop will help.

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First nuclear reactor for *industrial research* will be established at Armour Research Foundation after AEC approves design and schedule of operation. Reactor, or "atomic pile," will be housed in a new 8000-square foot building on Illinois Tech's campus in Chicago. It is planned to be ready in 12 to 16 months.

ARF reactor, a highly flexible neutron and gamma source for exploiting these radiations in research and development programs, is designed for ultimate operation of 50,000 watts or higher.

Industry is interested in this new tool because it will permit inquiries into sterilization of foods and drugs; structure of plastics, rubber, glass, ceramics, and other materials; nature of wear and friction; development of metals and alloys, and medical techniques. Chicago area industry will join ARF in financing reactor and equipment, which will cost about $500,000. — *Industrial Research Newsletter.*

More than 120 different petrochemical products are produced in the Gulf Coast by approximately 75 plants. These products range from carbon black for use in automobile tires to nylon salts used to make ladies' stockings. — *Petroleum Newsnotes.*

Industrial Arts and Vocational Education

JOHN J. METZ, Editor

SAN FRANCISCO, THE CONVENTION CITY, INVITES YOU

WHEN you receive this issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION you will still have the opportunity to make arrangements to attend this year's American Vocational Association convention at San Francisco, Calif.

Last year the American Vocational Association membership had a chance to see what Chicago had to offer the conventioneer. This year the old historic city of San Francisco is offering us its hospitality. It will be well worth every industrial arts and vocational educator's while to attend this year's meeting.

Dr. O. D. Adams, in his article, "Adult and Vocational Education in San Francisco," and Jess E. Rathbun's "Industrial Arts in San Francisco" present interesting previews of the practical education offered to youths and adults in the convention city.

Besides this the visitor will be afforded a fine view of this world-renowned city on our western coast. Registration will open Thursday morning in the city's civic auditorium, and from then until December 7, Dr. O. D. Adams and his assistants will be extremely busy in helping visitors get a good view of the schools of San Francisco and a firsthand view of industrial arts and vocational education as it is handled in the larger cities of California.

It will be wise to attend this, the 48th meeting of the American Vocational Association, for leaders in education, industry, agriculture, business, labor, and homemaking will all be there to discuss their common problems and to help industrial arts and vocational education improve their educational offerings to the youth of our country.

A JUBILEE TO BE NOTED

WE HAVE become so accustomed to the electric light that we take it entirely for granted. Yet, Edison's electric light bulb was nonexistent a little over 75 years ago.

The history of Edison's achievement in the realm of electric lighting is extremely interesting. October 21, 1954, marked the seventy-fifth anniversary of his invention of the first practical incandescent lamp. Before this, however, he had made over 1200 experiments on lamps in his laboratory in Menlo Park, N. J., beginning in 1877. Then after two years he got the inspiration to try a piece of carbonized cotton thread. To the great joy of Edison and his co-workers this filament did not disintegrate until forty hours had elapsed. That lamp was approximately the size of a present-day 110-watt lamp, and had an efficiency of 1.4 lumens per watt of electricity consumed.

Other developments followed that first success to make good Edison's promise made after that first lamp had burned forty hours — "If it will burn this long now, I know I can make it burn 100 hours."

Since then, improvement of the filament in various ways has raised the brightness from the original 1.4 lumens to 4 lumens. Then, when the pressed-tungsten filament was introduced, 8 lumens per watt was achieved. This was raised to 10 lumens when drawn-tungsten filaments had been perfected. Filling the lamp bulbs with nitrogen or argon gas has raised the actance to over 13 lumens.

Fluorescent lamps are still more efficient, but the simplicity of the incandescent lamp and its low cost will probably keep it in the forefront for a long time.

While electric light only has been considered so far, other inventions followed as a consequence to Edison's successful experiments to make that tiny filament incandescent by means of an electric current. It soon became evident that if the electric lamp was to be used for purposes of illumination, a great amount of electric current would have to be available, and that batteries alone would not answer. Naturally, inventive geniuses went to work at once and electric generators were produced in ever increasing sizes, so that electric energy could soon be used, not only for lighting, but for power also. As a matter of fact, if it had not been for the invention of the electric light, many of our present-day inventions would not be in existence. Radio and television for instance would be unknown, and the long hours of evening and night brilliantly lighted for industrial pursuits, or for entertainment and pleasure, would still be one of the items to be looked for in the future.

Edison's light has affected the lives of all now living. The youth of 75 years ago did not have the educational advantages of the boys and girls who go to school nowadays. Probably many youngsters today feel that it must have been heavenly to quit school at the age of 12 and go out to find a job. But they know little about the hardships many of those youngsters had to undergo during their lifetime because of their meager schooling. If modern students but knew what they had been spared, they would be very thankful to Thomas A. Edison for the electric light which he invented and which ushered into our lives so many things that now make our lives easier and more pleasant.

A WIDE ALUMINUM EXTRUSION

INDUSTRIAL-ARTS teachers and students are or should be interested in the wonderful progress made by industry. Teachers should make every effort to arouse this interest in their students.

Such an interesting bit of astonishing information was released September 27, 1954 by the Aluminum Company of America after they had succeeded in producing an extruded shape 23 in. wide which will be used in the fabrication of a tail section for one of the latest U. S. Navy jet fighters.

To make this section it was necessary to use the world's largest extrusion press at the Lafayette (Ind.) works of the firm.

The press at this plant can apply 14,000 tons pressure to force aluminum through the dies, and is capable of making sections up to 34 inches wide. These sections are extruded in a *V* form which are then flattened out, producing a stiffened panel which will serve for the horizontal stabilizer on aircraft produced by the Gruman Aircraft Engineering Corporation.

THE 1954 INDEX

This issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION is the closing number of Volume 43. If you wish to get an index for it, write to our circulation department and a copy of the index will be sent to you as soon as it is off the press.

A Helpful Study About

Selection Factors in Industrial-Arts Teaching as a Career

RALPH K. NAIR
Assistant Professor of Industrial Arts
and
LYNNE C. MONROE
Chairman and Professor of Industrial Arts
Santa Barbara College
University of California
Santa Barbara, Calif.

"What are the desirable features in industrial-arts teaching?" "Was expediency a factor in this occupational choice?" "Were there certain experiences which aroused interest in teaching?", and "At what grade level was a choice of industrial-arts teaching made?" — these and similar questions were asked of some industrial-arts teacher candidates who were about to finish their college work. It evolved that a majority of these students were materially influenced in their career choice by the appeal of the subject matter and by industrial-arts teachers themselves.

When this study was made a questionnaire was submitted to a random sampling of 526 teacher candidates majoring in industrial arts in three California colleges — the University of California at Santa Barbara, San Jose State College, and Fresno State College, as well as Colorado State College at Ft. Collins and Kansas State Teachers College, Pittsburg. Only those students who planned to enter the teaching field in industrial arts were included in the investigation, thus excluding those preparing to teach trade, industrial, or vocational education.

From a study of the father's occupation, Table I, it was found that 24 per cent pursued agricultural interests, 22 per cent were in the skilled trades, 19 per cent were in the professions, and the rest were somewhat equally divided between sales occupations — 6 per cent; business — 10 per cent; semiskilled — 9 per cent; and 4 per cent in unskilled fields of work. From this evidence it seems there was a tendency for over half of these students to aspire to an occupational area requiring considerable training either as formal education or practical work experience comparable to the occupations of their fathers.

TABLE I. Occupations of Fathers

Agriculture	24%	Clerical and sales	6%
Skilled trade	22	Semiskilled	9
Professional	19	Unskilled	3
Business	10	Miscellaneous	7

The investigation brought out the fact that a preponderance of future industrial-arts teachers in California completed their secondary school education in metropolitan areas (70 per cent) rather than from rural or small town locations (30 per cent). Whereas in Colorado and Kansas the reverse was true.

Reflecting the influence of the age in which we live and the changes in our society, 84 per cent of the teacher candidates were veterans of the recent war, and 73 per cent were married. As to scholastic rank, 56 per cent were graduate students, 24 per cent were seniors, and 14 per cent were juniors, leaving 5 per cent sophomores and 1 per cent freshmen. Average age was 29 years and 6 months.

Enumerating the desirable features, Table II, industrial-arts teaching, over 90 per cent of these groups were attracted by desirable working conditions, a feeling of security, and interest in mechanical activities as most significant in leading them to a choice of industrial-arts teaching. In addition, 88 per cent signified a desire to work with young people and 72 per cent were motivated by a desire to be of service to society with a comparatively desirable salary.

TABLE II. Desirable Features in Industrial-Arts Teaching

A. I like the working conditions	97%
B. It offers a sense of security	94
C. It deals with mechanical activities	90
D. I want to work with young people	88
E. I desire to be of service to society	72
F. It pays a comparatively desirable salary	72
G. The position offers prestige in the community	63
H. The shorter hours of work are desirable	60
I. It offers advancement to a higher educational position	57

It was gratifying to observe the response given to interest in young people and in service to society, since it was hoped to preclude insincere answers by not requiring signatures to the questionnaire.

Because an overwhelming majority of the groups studied were veterans, the question arose as to the effect of military life and the resultant educational benefits upon the choice of industrial-arts teaching as a career, particularly since the counseling program of the veterans' administration has been the first co-ordinated guidance effort on a national scale. Yet, only 41 per cent indicated that the G.I. educational opportunities had affected their choice. While this investigation could not render a valid test of the effectiveness of a national counseling service, it is interesting to note that only 30 per cent of the men in the study felt that this service gave assistance in their final choice of a career. It must be recorded, however, in interpreting these data that in most cases the counseling service of the veterans' administration was mandatory only for those under Public Law No. 16.

In considering expediency, Table III, as a factor in occupational choice, it was found that slightly over one third of the students questioned planned to use industrial-arts teaching as a steppingstone to another occupation. If we realize the general educational values of industrial arts and if we anticipate

that some of these men will enter educational administration or supervision, we should be happy to have these men gain an appreciation and respect for industrial-arts experiences, even though they plan to leave the field eventually. However, even if these men aspire to occupations outside the field of education, they may still have gained satisfying hobbies and will likely encourage and sponsor home workshop activities for their children.

The decision of 36 per cent of these students to enter the field because of proximity to family and friends might still be considered legitimate in studying the occupational pursuits requiring travel and absence from home. While 9 per cent admitted they had failed in pre-engineering and "This was the next best thing," only 4 per cent said "The college was near and I had to do something." Encouraging too is the fact that only 3 per cent felt it to be the easiest profession to enter with little training.

TABLE III. Expediency as a Factor in Occupational Choice

It offers a steppingstone to another occupation	39%
It offers an opportunity to be near family and friends	36
I failed in pre-engineering and this was next best	9
The college was near and I had to do something	4
Easiest profession to enter with little training	3

The young men in this study were asked to indicate the circumstances surrounding their first close, Table IV, contact with actual manipulative work in the hope that this might indicate other factors in the choice of industrial-arts teaching as a career. While home workshop activities, secondary school industrial-arts classes, and individual hobbies were on an equal basis for 75 per cent of the group, the remainder were divided among elementary school handwork, part or full time work experience, and Boy Scout activities. Seeing that industrial-arts activities in the schools are related to a majority of these initial manipulative activities, a grave responsibility rests upon the teacher of industrial arts in making this introduction a pleasant and satisfying experience, irrespective of whether it may become an occupational choice.

TABLE IV. First Close Contact With Actual Manipulative Work

Home workshop activities	25%
Jr. or Sr. H.S. industrial-arts class	22
Hobbies (individual or group clubs)	22
Part- or full-time work experience	14
Elementary school handwork activities	12
Boy Scout activities	5

In discussing a single experience, Table V, which aroused most interest in teaching as a career, 70 per cent of these students had had a course in industrial arts in the public schools and had enjoyed the experience. Over 50 per cent remembered a talk or lecture or class in school, and the remainder listed a wide variety of experiences as being highly influential, such as books or magazine articles, clubs, trips, excursions. In analyzing the majority who thought a class or talk in school most influential as an experience, one might conclude that they refer to an industrial-arts class since 70 per cent had had this experience.

TABLE V. An Experience Which Aroused Most Interest in Teaching

A class in school	27%
A talk or lecture	25
A book or magazine article	2
A club or organization	2
A trip or excursion	1
A contest	1
A movie	1
Other	41

Apparently the single individual, Table VI, most influential in the choice of teaching as a career was a teacher or other school personnel. Home influence was negligible, since only 10 per cent of these parents had exerted undue pressure. An analysis of the distribution on this question indicates a total of 50 per cent for the teacher-counselor-administrator combination and of only 17 per cent for the student's immediate family, including father, mother, brothers, and sisters.

Further, 20 per cent of these men were influenced by a shop teacher who was "ideal," and one third of the group had teachers who suggested they become teachers of industrial arts. By separate check questions, it was found that 25 per cent attributed their choice to one individual, and 15 per cent to a school counselor, which confirmed earlier findings.

TABLE VI. The Person Most Influential in the Choice of Teaching

Teacher	24%	Mother	6%
Friend	17	Relative	4
Counselor	17	Siblings	3
Father	7	Other	22

Further investigation of school influences to determine the Table VII grade level of the first industrial-arts class showed that approximately one fourth of the group had their first contact with industrial-arts activities in the elementary school, 60 per cent in the junior high school, 10 per cent in the senior high school, and 7 per cent on the college level. This evidence seems to support the coverage of the industrial arts in the exploratory curriculum on the junior high school level.

TABLE VII. Grade Level at Which Choice of Teaching Was Made

Elementary school	0%	Senior high school	11
Junior high school	3	After high school	31%
		College	55

Although some relationship seems to exist between the choice of industrial-arts teaching and experiences in industrial arts classes, yet for one third of these students the actual decision to enter the field was not made until after high school graduation.

Several reasons might be advanced for the delay in decision, reasons which might be applicable to other fields as well. Although tentative decisions sometimes are made in younger ages, the young person needs a certain amount of maturity to recognize the importance of his vocational choice and the posibility of his success in that choice. From meager counseling facilities in the past, too many young people are faced with the impact of a necessary occupational choice after high school graduation or a decision to enter college.

Another possible reason for the delay in decision of this particular group may have its roots in the preponderance of veterans whose educational and vocational plans had been interrupted. On returning from the service, these men were often self-conscious in the high school setting and completed their pre-college work through the armed forces schools, junior colleges, or college extension work.

An implication for counseling is seen in the fact that over half of this group expressed the belief that their teachers should have been of more assistance in their career problems. Although one fourth of these potential teachers indicated their choice of industrial-arts teaching was largely due to chance, 80 per cent signified a true interest in the field as an ultimate career. In this connection, an overwhelming majority of 95 per cent were happy in their decision, after weighing personal assets and occupational opportunities. Only a very few would make another choice if it were feasible and possible.

Certain implications might be drawn from the data compiled in this questionnaire. First, since parents apparently do not exert as much influence as the school in the choice of industrial-arts teaching as a career and probably other vocational selections, these parents should be vitally concerned with the selection of the school personnel.

Second, since industrial-arts teachers do influence their students to the extent shown, they should be in a favorable position to attract desirable teacher candidates who have interest and aptitude.

Third, administrators who are interested in developing a functional guidance program should be cognizant of the influence of industrial-arts teachers whose informal atmosphere in the shop leads to effective counseling.

Finally, to the men in the field of

industrial-arts teacher education, this investigation reveals some interesting, and perhaps significant, information. Their charges are not young men looking for short cuts to a respected place in the community, they are not cast-offs from engineering courses, and they are not planning to desert the field for more lucrative positions. They are young men who desire to be of service to society, who wish to work with young people, who like mechanical activities, and they desire the ultimate in men's search for happiness, a feeling of security.

Problems and Projects

SANDBLASTER FOR THE SCHOOL SHOP

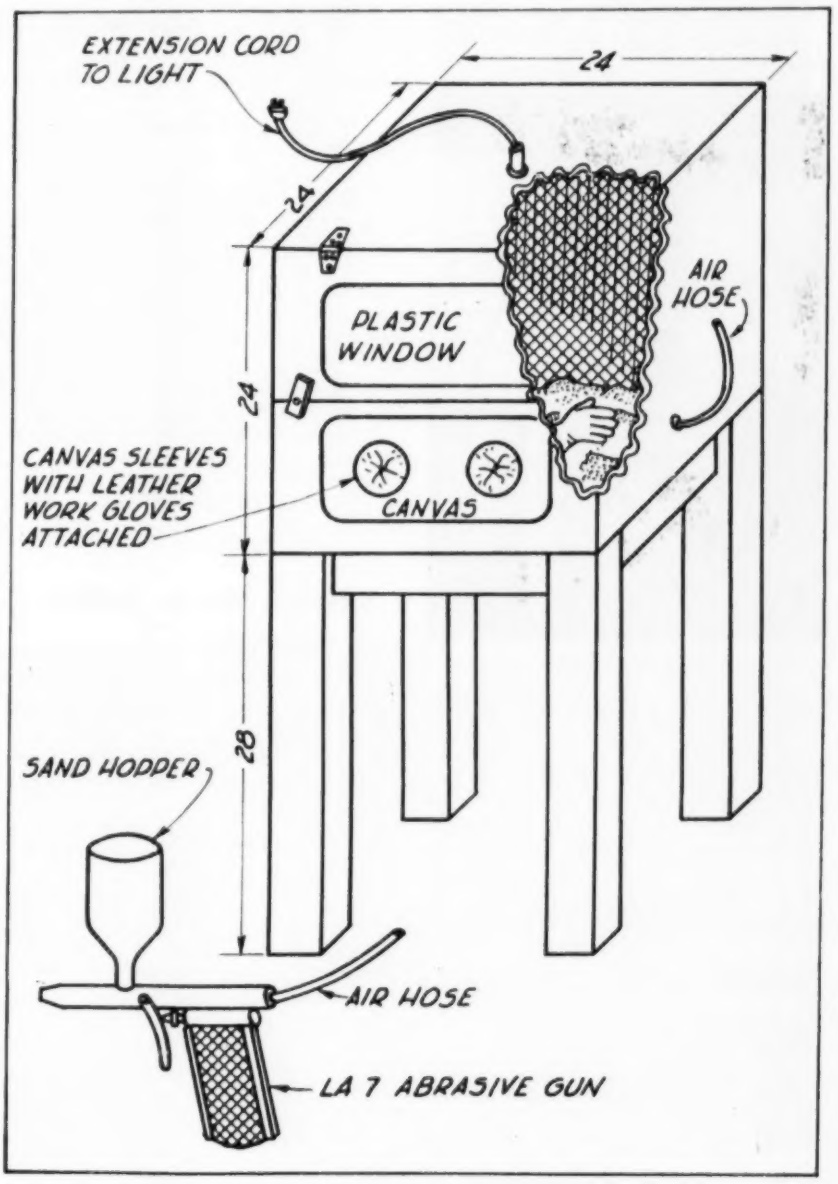
ALVIN R. LAPPIN
Assistant Professor of Industrial Arts
Los Angeles State College of Applied Arts and Sciences
Los Angeles, Calif.

A sandblaster may be considered by many as a special piece of equipment which is too expensive, and which has little use in the average school shop. However, the sandblaster, illustrated in this article, was constructed by high school students, and has been used by them during a three-year period with unusual success.

Among the many uses of the sandblaster may be listed the surface enrichment of metal, glass, plastic, wood, and leather by employing heavy paper or metal stencils, leaving exposed only the surface to be sandblasted. This special piece of equipment is also excellent for cleaning rust, grease, corrosion, and paint from metal parts.

Once used, the sandblaster will be found an indispensable piece of equipment for the school shop. It is especially recommended for the general shop, but is also worthy of a place in almost any unit shop.

The sandblaster was constructed of ½-in. plywood, and mounted upon a wood frame. The notations on the illustration will serve to give the details for making this piece of equipment. A plastic window is recommended since it is not only safer than glass, but may also be removed occasionally and buffed to eliminate the scratches caused by the impact of the flying particles of sand against it. Other recommendations for greater efficiency are: The use of a glass jar over the light bulb to protect it against flying particles of sand, replaceable when it has lost its transparency; a rubber gasket, employing the principle used in refrigerators, to seal the door against any leakage of dust; and a coat of white paint inside to increase the reflective value of the light.



A sandblaster for the school shop

An LA 7′ abrasive gun, using a fine sharp-grained sand and from thirty to fifty pounds of continuous air pressure has worked very satisfactorily.[1]

By varying the air pressure, many different surface appearances of the material being blasted may be obtained. A one-hundred pound sack of sharp-grained sand is adequate for the size of sandblaster illustrated, and may be used over and over since there is no loss of sand in this sealed cage.

How to Use the Sandblaster

1. Place the article to be sandblasted inside the enclosure, then securely fasten the door.
2. With sufficient air pressure available, and the light in the cage illuminating the work, push the hands through the canvas sleeves into the leather work gloves.

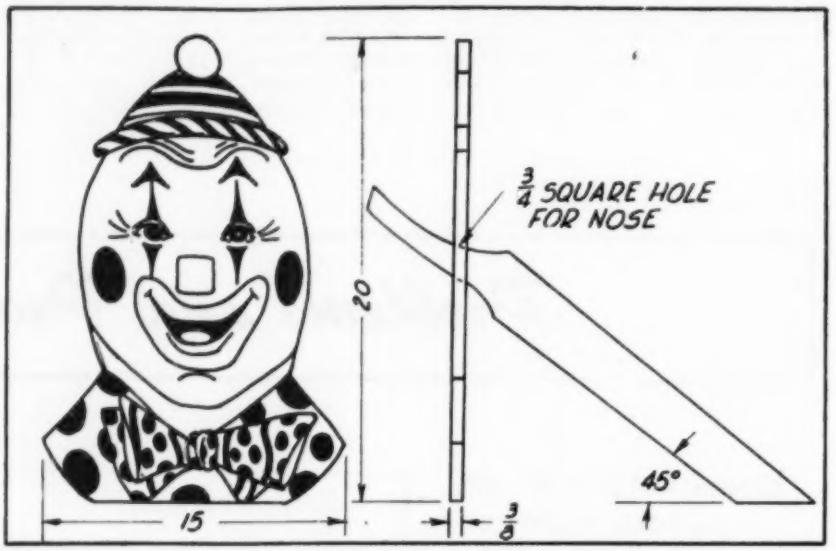
Student operating the sandblaster

3. Hold the article to be sandblasted with one hand, and grasp the abrasive gun with the other.
4. Dip the open top hopper of the gun into the sand to fill it, then hold it in an upright position and pull the trigger.
5. Experiment by holding the nozzle of the abrasive gun at various distances from the article being sandblasted until the desired results are obtained.

CLOWN RING TOSS GAME

SAM FENN
Chicago, Ill.

Here is a ring toss game which may be made in any size and various designs. It is very easy to make with a few common tools and very little material. Students will be happy to make this project.



Details of the clown ring toss game by Sam Fenn

Directions

Obtain a piece of plywood or thick cardboard, and a piece of wood for the support. Cut out as per drawing and paint face in desired colors. Use rubber rings (preserve jar rings will do), or prepare plywood or cardboard rings.

In playing the game, the one who hangs the most ringers on the clown's nose, wins. Children and adults will enjoy this game of skill. This project will make a nice Christmas gift.

SILHOUETTES IN WOOD

DICK HUTCHINSON
San Gabriel, Calif.

With the ever increasing interest in hobbies, and woodcrafting, many new tools have been developed. With these tools many interesting things can be made, and as a result, wood carving is fast becoming one of America's most popular hobbies with our young men and women.

Readers who are interested in wood carving may feel that they do not know how to get started. The articles shown herewith display an interesting method of producing pieces of fine art in the form of surface carving that can be made easily without talent or art ability.

Hand carving silhouettes, and surface carving in softwood is very fascinating, and the results can be very beautiful. This form of carving is one of the simplest methods of producing art objects by hand. Simply trace any suitable subject onto the surface of the softwood, then carve it out.

First, we will talk about tools. There are many wonderful tools that are excellent for surface carving. The least expensive, and the most universally used are the hand wood-carver's chisels. Both the wood carver's, and the linoleum cutting chisels are shown in Figure 1. Personally, we like the linoleum cutting tools for all of our hand surface carving because the blades are narrower, resulting in finer

Fig. 1 (above). To the left, a set of linoleum carving chisels, and to the right, a set of wood carver's chisels

Fig. 2 (below). A hardware case completely equipped with everything any wood carver might need to do a great variety of woodcarving

[1]The LA 7′ abrasive gun is manufactured by Paasche Airbrush Company, 1909 Diversey Parkway, Chicago 14, Ill.

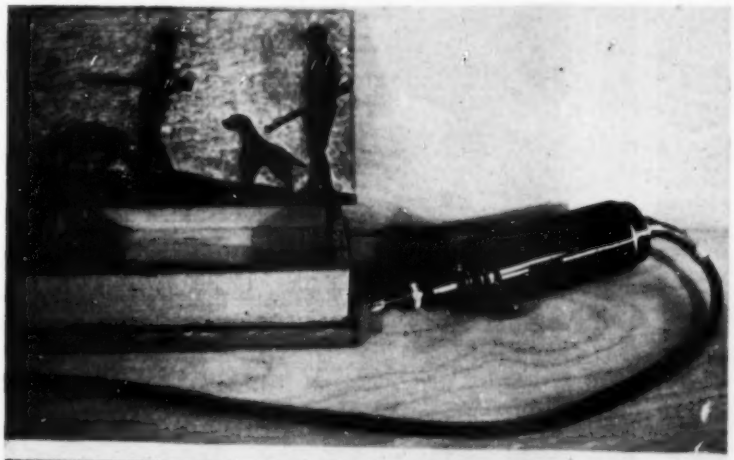


Fig. 3 (above). Here we show the silhouette of **The Hunters and Their Dogs** used to decorate the cover of a jewel box, and at the right, the motor-in-hand tool

Fig. 8 (lower). Silhouette of **The Hunters and Their Dogs** done in soft white pine

Fig. 4 (above). **The End of the Trail** partly carved out in white pine board

Fig. 5 (below). The finished silhouette

tool marks, and in wood carving, the tool marks denote the work as having been done by hand. If a carved piece is too smooth it does not represent good wood carving.

In Figure 2 is illustrated one of the most complete sets of hand carving tools ever made. This set includes every tool necessary for this work — interchangeable handles into which may be fitted a large assortment of carving knives and chisels, along with a coping saw, hand drill, ham-

Fig. 6. Using the flexible shaft for carving **The Cowboy and Horse** plaque

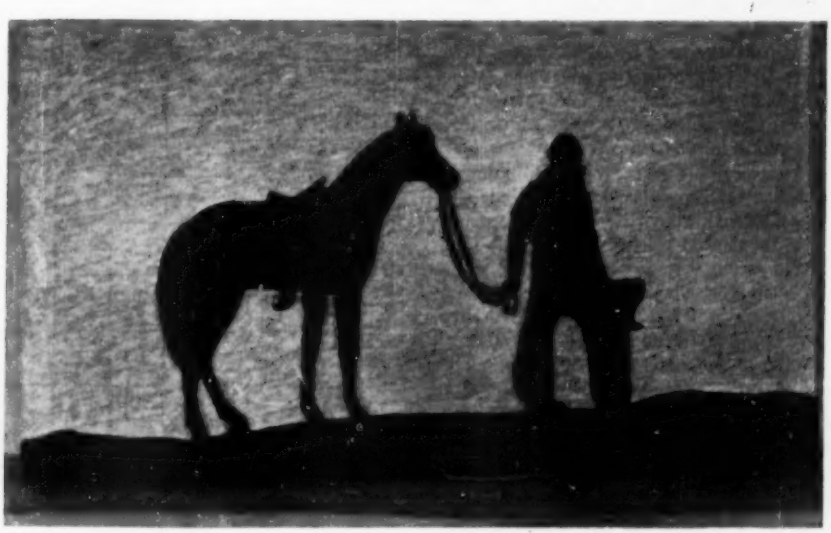


Fig. 7. The completed silhouette of the **Cowboy and Horse** plaque. A beautiful piece

Fig. 9 (at left). This picture shows how really interesting a butterfly carved in soft wood can be. Fig. 10 (at right). Here the author is using a linoleum carver's gouge for carving the butterfly

mer, pin vises, screw drivers, *C* clamps, plane, sanding block, etc.

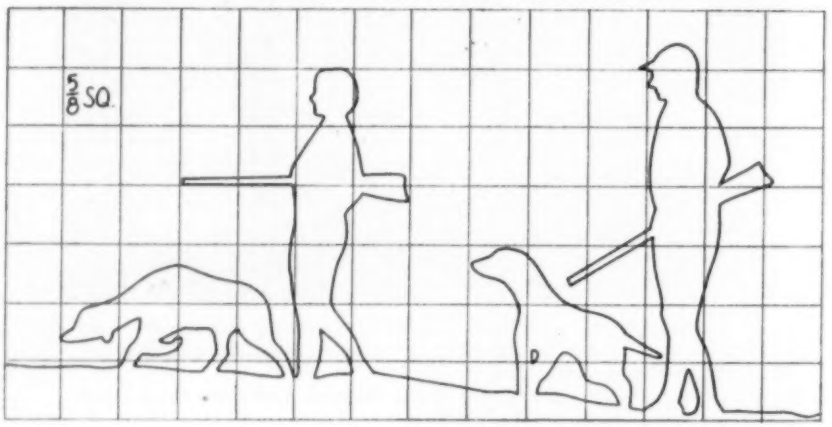
Many readers will no doubt own one of the various brands of motor in head tools shown in Figure 3. The motor that drives this little machine is housed in the head. The piece is equipped with collet chucks, into which may be fitted an assortment of sizes and shapes of carving cutters. The piece is made to be held in the hand much like a pencil, and a lot of carving can be accomplished in a short time by its use.

Of all of the carving tools made we prefer the flexible shaft. This too is so easy to operate that even the ladies enjoy working with it. It is as easy to operate as a pencil, and it works fast. The cutters are fitted into a collet chuck, as with the motor-in-hand tool, and the pencil like tool is governed by the hand of the operator, as shown in Figure 6.

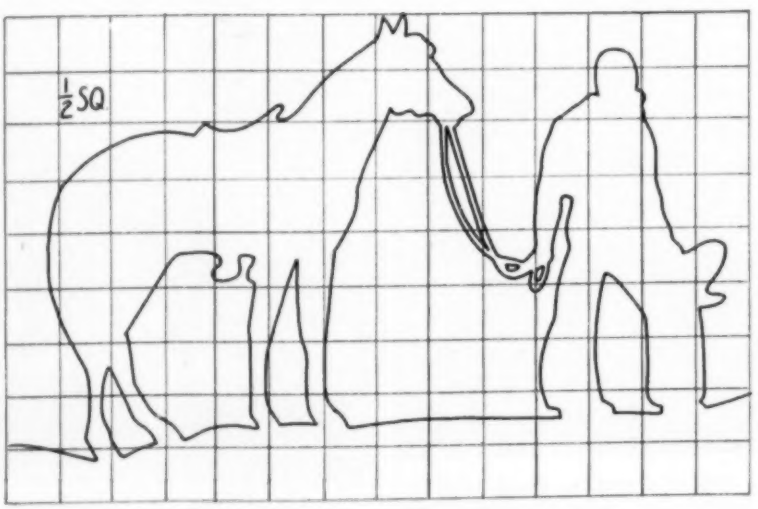
We are showing three outline drawings which may be used by the beginner. However, any subject that will make an attractive silhouette may be used. Many subjects may be selected from illustrations appearing in magazines.

Using carbon paper, trace the outline of the subject onto a smooth surfaced ½-in. piece of white pine the right size to make a well-balanced picture. There is no carving done on the subject itself in this type of surface carving. First, outline the subject and the frame, if a frame is desired, with the carving tool. Then, carve out all of the background as illustrated in Figure 6, leaving the subject smooth and even for the final black (silhouette) finish.

Figure 4 shows the silhouette of *The End of the Trail*, partly carved out. This plaque was all carved with the linoleum carver's gouge. Carve to a depth of about 1/16 in., and allow the tool marks to stand out, as shown. Figure 5 shows the completed picture.



The hunters and their dogs silhouette



The cowboy and his horse silhouette

Figure 6 shows a carver using the flexible shaft to do the carving. This method is quite fast. The author carved the *Cowboy and Horse* with the flexible shaft in 37 minutes. The completed picture is shown in Figure 7. With this particular piece there is no frame around the picture. The background is carved out to the edge, and the edge is slightly rounded. The silhouette on the jewel box cover shown in Figure 3 was done in the same manner, only that the motor-in-hand tool was used to do the carving.

Figure 8 is of *The Hunters and Their Dogs* plaque. This piece was also carved with the flexible shaft.

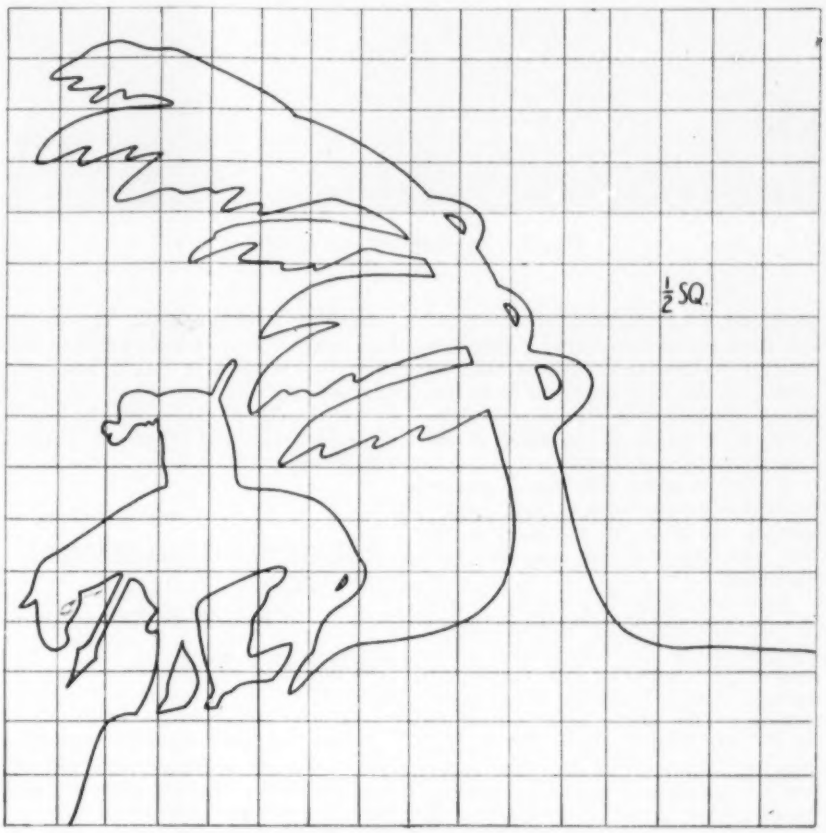
A word about cutters that will save a lot of money, and provide a means of obtaining some cutters free. There are many types of cutters on the market, and you will need to buy some. However, if the reader will drop in to see his dentist he will find that he is throwing out slightly used dental burrs that have served their purpose for his work, and he will be glad to give them to you. These dental burrs are excellent for all kinds of carving.

The butterfly shown in Figure 9 was all carved out with the linoleum carving tools, as shown in Figure 10. Here we selected a large butterfly pattern from a magazine illustration. Traced it — in all of its detail — onto the pine board, then carved it all out by hand. It was a delicate job, but the results were a worth-while reward, which proves that carving can be fun.

To finish the butterfly, we gave the surface a coat of white shellac, and when dry we brushed on a coat of thinned chocolate brown oil paint, and wiped over the high lights immediately with a soft cloth.

For some silhouettes a sunset background is needed more or less. To produce this we thinned cadmium orange artist's oil paint with turpentine, then added just enough vermilion (red) to obtain the right shade. Using a paint brush, wash this over the background, and let dry. Then, using a small artists brush, paint the subject, and the outline frame with flat black Enameloid, and when dry, if a slight gloss finish is desired. Rub over the velvety black surface vigorously with a soft cloth.

Attach hangers to the back of each plaque, and your silhouette pictures are finished.



The end of the trail silhouette

BOWLING PIN CANDY DISH

DELBERT A. DYKE
Professor, Industrial Arts
Murfreesboro, Tenn.

Most industrial educators agree the ideal project should afford maximum manipulative opportunities for practice, have a utility value when completed, and the total cost should be reasonable. The project described in this article has all these characteristics and the cost is most reasonable.

Many communities today have recreational facilities that include bowling. The bowling pins are a good source of quality materials. The pins have a definite life of usefulness even after being reconditioned, and are available in many instances just for the asking.

The candy dish described in this article includes many operations usually found in a beginning woodworking course or in an elementary craft program using inexpensive materials, and little or no power

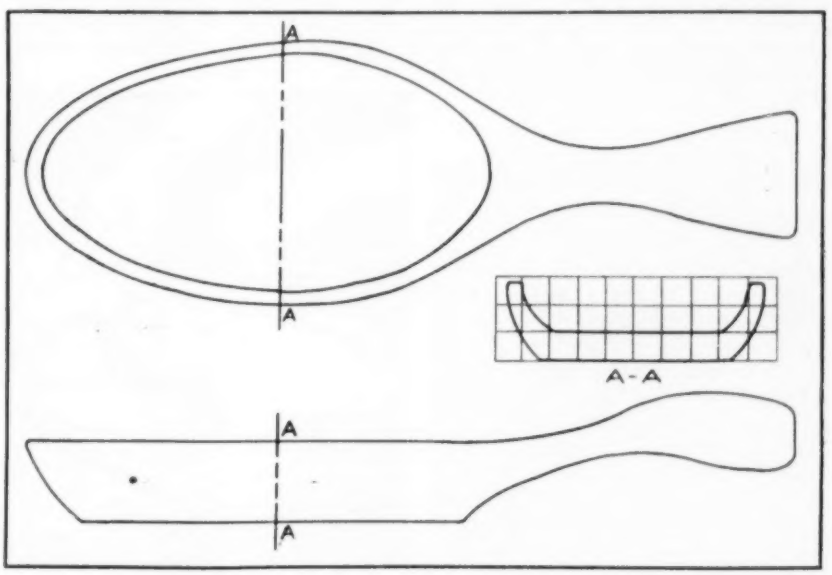


Fig. 1. Bowling pin candy dish

Fig. 2. Bowling pin candy dish

machinery. All experienced instructors and craftsmen realize the dangers involved in trying to manipulate an irregular shape on power woodworking machines. It is suggested, therefore, that the use of a minimum of machines be permitted in the construction of this project.

It will be noted that dimensions are omitted in the drawing (see Fig. 1), as the exterior condition of the bowling pin will determine the maximum size when completed.

After determining the area to be used for the dish proper, the blemishes on the exterior surface should be removed with a spokeshave, plane, or belt sander. An optional starting procedure might be advisable if the entire project is to be made with hand tools only. By marking top and bottom of the dish, then sawing away waste material with a hand ripsaw, surfaces that permit easier clamping in the vise are obtained. Removing the waste from the inside of the dish can be speeded up considerably by using either a portable drill or the drill press and drilling interlocking holes of desired depth; however with sharp gouges, the job can be finished by hand in surprisingly short time. If an assortment of rotary files is available, they can be used for the final smoothing of the inside portion of the dish.

The first step in a good finish of any project is the initial sanding. This cannot be overstressed. One of the many hand-rubbed finishes will complete the candy dish.

Making something artistic and useful from materials that are considered of little value teaches thrift, economy, and conservation. Although these are important factors in the education of the whole child, few educational experiences emphasize all three.

POLYESTER COLD-SETTING PLASTICS IN THE SCHOOL SHOP

ALEXANDER F. BICK
Milwaukee, Wis.

Of the present industrial materials, plastics play an increasing part, year by year. In 1951, the industry produced $475,566,000 worth of material. Compare this with the 705 million of the millwork industry, or the 658 million of the pulp and paper industry and one can grasp the magnitude of this newcomer on the present horizon. There is hardly a field it has not invaded; and the industry is expanding, doing better or less expensively what other materials had been doing less efficiently.

All students will meet with plastics in their life or work, and many will earn their living directly in the plastics industries; and it follows that schools should now be ready to furnish the necessary precontacts in terms of clear pictures and at least of general understandings and experiences.

The industrial-arts departments are eminently fit to give these precontacts in either their wood or their metal sections. To this end the basic chemistry is solved for them: the material is ready, and it has a literature and simple 1-2-3 formulas that anyone can follow. Furthermore, the department needs no special equipment or preparation. The idea may be put into use today.

It is not sufficient that contacts with plastics be through the mere reshaping of precast commercial sheet. The resulting experience is not enough: it should include the simple chemistry of which the industry is a part. Thus, introducing this work into the shop brings practical chemistry into the lower school levels and requires the use of laboratory procedure without the serious consequences of inexact formulation. The projects illustrated in this article are eighth-grade work, and can be done as well in seventh grade.

For this purpose, polyester cold-setting plastic is the ideal material. It is flexible and it possesses a fresh potential. It is timely, and it is representative of the new age. It is, furthermore, on the school level, having been classroom tested for some years.

As a teaching material this plastic has a margin of advantage over others in its field, being molded cold from the liquid state directly in the classroom. The transformation of the material is a striking lesson to young students, and we can think of nothing that drives home the marvel of chemistry so well. Projects made of it fall into a category all their own, being closer to the over-all average of manufacturing practices in the field of any that a school might afford.

A strong point also is the fact that the material is useful in the average class,

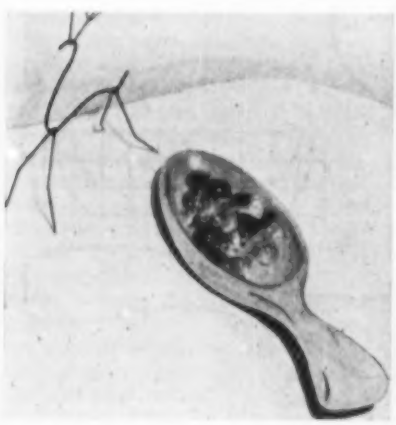


Fig. 3. Bowling pin candy dish

Fig. 1. The materials required for making cold-setting plastic projects

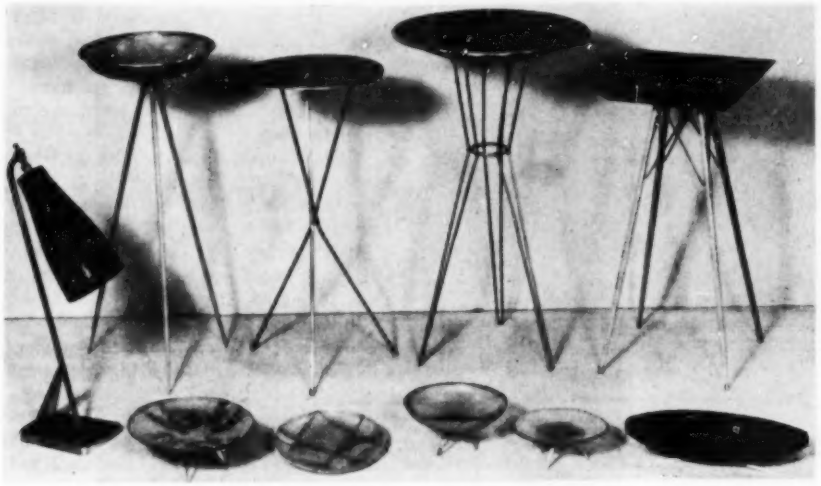


Fig. 2. Projects made of cold-setting plastics

requiring no exceptional skill. At the same time, it is a material that requires highly creative thinking, inducing a natural flow of inventiveness and planning.

It provides an excellent tie-in with metalwork and with woodwork, metal or wood legs being attached to the polyester table tops or bowls with a simplicity almost uncanny. The plastic is brushed over the joint and a piece of glass-cloth "makes it as strong as steel."

The work under this category also provides an excellent tie-in in the art department whose fabric designs and its screen and direct printed cloth may be used together with glass-cloth in the laminated casting of bowls, table tops, cases, chairs, etc.

The use of this plastic is economical for schools, needing no other than wood or metal shop equipment already provided. It is also economical for the student, the project costs ranging in the same scale as those for the average wood project.

The student rating of this material is high, again and again receiving a spontaneous "the most interesting subject."

The illustrations show the versatility of cold-setting polyester resin, and it can be seen how the shops will now be able to do what has thus far been impossible, such as the making of spot lamp shades and other shades, radio cases in one piece, tackle boxes and carrying cases in one piece sections, one piece plastic chairs, musical instrument bodies in one piece, etc.

Space in this article is necessarily limited, and not enough detail may be given to afford a broad view. However, this is but one of a series of articles, and it is hoped that at the end, enough information will have been given to arouse sufficient interest in those who lack the firsthand seeing of an actual casting operation to cause them to make the initial move toward obtaining some of it and experimenting with it. Seeing the casting operation, in the writer's case, was a most convincing argument as to the merit of this teaching material.

The remaining space is given to the step by step procedure in the making of the shallow-bowl knitting stand shown with the double wire aluminum legs held with a center ring. Other items are made in a similar way. The small bowls are cast over turned wooden forms, while the large one in question was cast over a plaster form. This was scraped into shape with a metal template in the wet plaster of Paris freshly cast over a wire screen armature, as drawn. The template is pivoted on a center wood block. All molds are shellacked to a high gloss after thorough drying, then coated with Castoseal and waxed several coats and lightly buffed. Thereafter, the steps in casting are as follows:

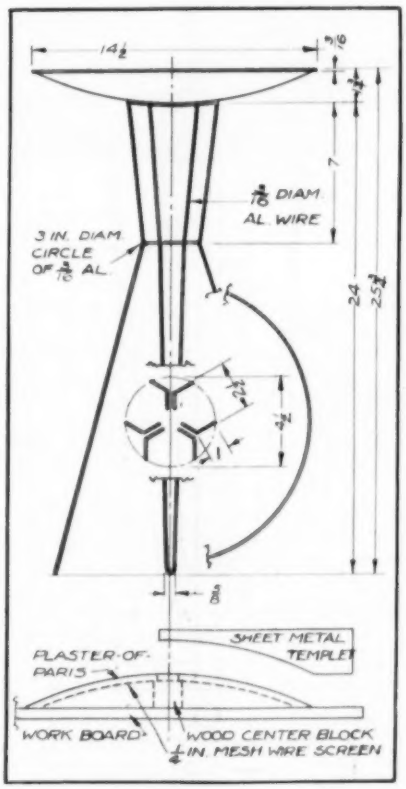


Fig. 3. Details of project and mold

1. Cut a circle of fabric to fit the mold about ½ inch oversize all around. Since this material is to be seen from the top, a fabric may be screen printed as part of the project, or a piece of commercial print may be used. The pattern in either case should be in contemporary style to carry the spirit of the plastic and the age.

2. Cut a second circle of Fiberglas cloth such as is sold by the plastic supplier. Other cloths do not have the necessary open weave.

3. Cut a third circle of heavy white fabric if such pieces are available from surplus home reserves, otherwise, cut a second Fiberglas cloth circle.

4. Lay out news or wrapping paper on which to work. Set in order the materials to be used as shown in Figure 1: the can of "Castoglas," (Castolite company, Woodstock, Ill.), the bottle of hardener as furnished by this company, the measuring cup, the measuring spoons, the stirring sticks, the eye dropper, the brush, the brush and finger cleaner, and a disposable cup for brush cleaning. Also, have some toweling ready.

5. Read the directions and make sure about the procedure and the mixing proportions.

6. Mix the plastic:
   - *a*) Pour out a three-ounce paper cupful of "Castoglas," to ¼ inch of the top. Wipe the spout and close the can.
   - *b*) With the eye dropper, fill the ¼ teaspoon measure round full with hardener (catalyst) and add to the Castoglas. Cork the hardener bottle and clean the measuring spoon with toweling.
   - *c*) Mix the plastic syrup and hardener thoroughly, using the stirring stick.

7. Proceed with the casting. You will have ten minutes for the job.
   - *a*) Paint the mixture directly over the waxed mold.
   - *b*) Lay the printed fabric, face down, over the wet surface.
   - *c*) Paint a second layer of the mixture over the first fabric.
   - *d*) Lay the Fiberglas cloth circle over the second coat.
   - *e*) Paint a third coat of the mixture over the Fiberglas cloth.
   - *f*) Lay the last fabric circle over the third coat.

g) Paint a fourth coat of the mixture over the last cloth. Stroke out all air bubbles as each coat is laid down.

8. If the edges do not lie down close to the mold, weight them with any convenient metal parts, but watch to remove these just after gelation so that they do not adhere to the casting.

After the first try, the reader will agree that the process is a "miracle" of ease. Clean the brush, and clean the fingers with a little of the commercial cleaner and then wash in kitchen cleanser.

Shallow bowls will warp as wood also would warp. Bowls with deep rims are free of warp in most instances. The shallow bowl in this project is reinforced with a hoop of 5/32 or 3/16 inch wire, and notice the ease with which this is attached. See that the hoop is bent true and lay it over the underside edge, mix a small batch of "Castoglas" and hardener, add to the mixture an equal amount of "Castosil" (powdered glass fiber), and paint it into the joint. That is all. Allow several hours to harden, and then remove the casting from the mold by carefully lifting with a spatula, little by little all around. It will pop off. Trim the casting with a tinners snips, file or grind the edge down on a sanding wheel, and finish coat the edge and inside if desired. The last step is not required. Legs are attached as was the rim, but add a small strip or two of Fiberglas cloth over each joint for strength.

The finished casting may be colored or not, adding "Castoglas" color paste to a final mixture of "Castoglas." Also cutout wood or fabric design forms, loose colored thread, wires, sequins, etc., may be embedded by arranging them over the first wet coat. Designs may also be painted over the top surface directly, using colored "Castoglas." Thus the project may be as creative as the teacher desires.

If the above were demonstrated rather than written, the reader would be amazed at the simplicity of the process and at the result. The teacher needs to make the first step with whatever effort fits the occasion while the urge to do it is before him.

(The next article will treat of a one-piece laminated plastic chair.)

A MODERN WOOD TABLE LAMP

ROLAND BACON
Head, Dept. of Industrial Arts
George Washington High School
Danville, Va.

1. Square up two pieces of stock 2¼ by 2¼ by 11½ in., for the upright.

2. Lay out inside design on the two halves, cut out with band saw and smooth.

A modern wood table lamp

3. Glue the two halves of the upright together.

4. Lay out outside design, cut out and smooth.

5. Center ends, place in wood lathe and do the taper turning. Blend in taper at top of upright to suit individual taste.

6. Bore ½-in. holes for pipe while lathe centers are still marked on ends.

7. Bore holes for ½-in. o.d. brass or copper tubing.

8. Hole at top must be plugged, then rebored for ⅛-in. threaded pipe.

9. Do faceplate turning of base and bore holes for tubing and lamp cord.

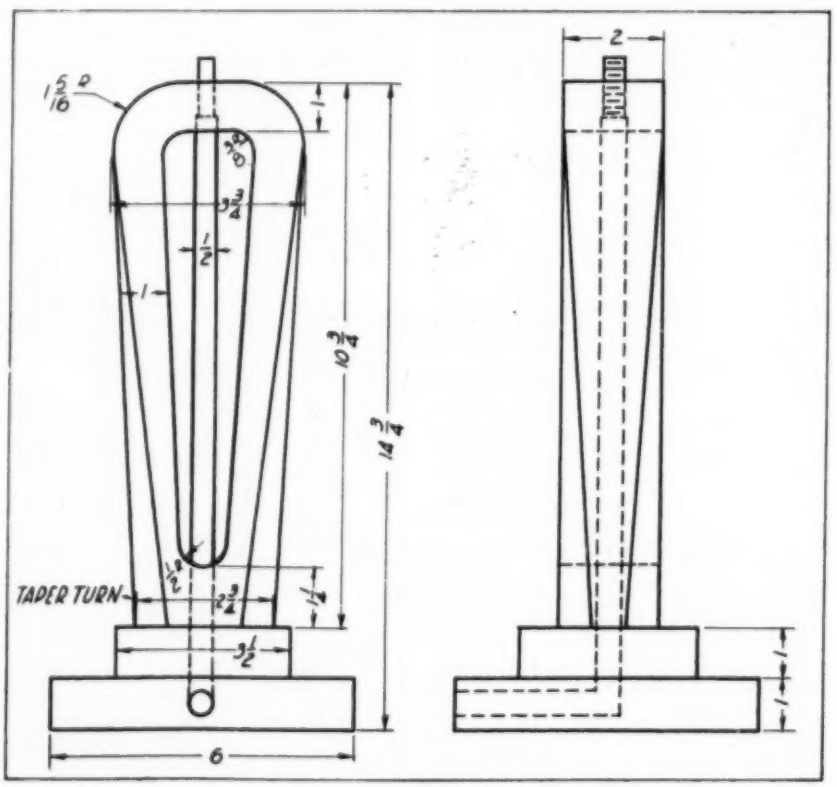
10. Base may be fastened to upright with f.h.b. wood screws or dowels. Press fit of tubing in holes should be sufficient to hold it in place. Tubing should be polished and lacquered before assembling.

11. The blond finish applied to this lamp, which was made of white oak, consisted of white paint thinned with turpentine and used as a stain followed by white shellac rubbed down with steel wool and a wax polish.

THE OUTDOOR FIREPLACE AS A DRAFTING PROJECT

WALTER P. BUSCH
Woodrow Wilson Junior High School
San Diego, Calif.

Today it is a familiar sight to see outdoor fireplaces in American back yards. The therapeutic effect of the open fire in allaying discord and fusing human loyalties



Details of a modern wood table lamp

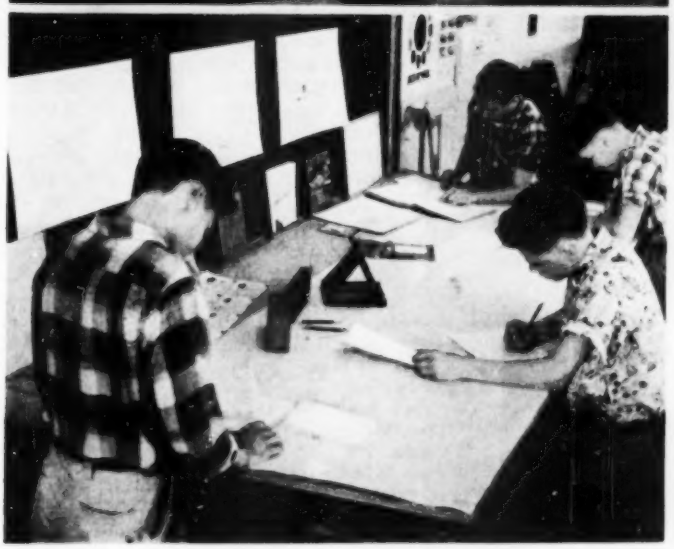


Fig. 1. Looking for ideas; and Fig. 2. Making the preliminary sketches

— San Diego City Schools Photos

is a fact not to be lost sight of in our practical and technical discussions. I'm sure many have enjoyed this warm friendly experience at one time or another.

The idea of using the outdoor fireplace as a drawing project started several years ago while the writer was sitting in front of one of those restful outdoor fires. He tried it out as a classroom project, and yearly now the students in each class have developed thirty or more different designs of outdoor fireplaces, each student expressing his own idea of what he likes. The whole class participates, and everyone collects sketches of outdoor fireplaces for his source material from local papers, magazines, and brick and cement block industrial establishments.

It may be asked, "What are the teaching values of the outdoor fireplace?" It supplies us with a here and now project that the boy and his parents understand. It is not uncommon to find parents actually building outdoor fireplaces of their own while the unit is being presented. Often the student brings home ideas, sources of design, and helpful information about supplies. Thus the unit co-ordinating school and home meets social as well as a practical standard. It is also of value to encourage visiting homes where outdoor fireplaces are in the process of construction.

The project furnishes a medium of presentation through oblique, isometric, perspective, or orthographic drawing depending upon how the student wishes to present his project. Ideas of shape, size, and kinds of material may be obtained from the sketches collected and by additional field trips to brick and cement block distributors.

Very few projects stimulate student interest to the degree experienced in the unit on outdoor fireplaces. Interesting and valuable facts about the construction industry are learned in the correlated learning experience we refer to as related information such as, sizes and patterns of brick, the chemical action of water and cement, reinforcing materials, information about sand and gravel footings for these heavy projects. On one of our field trips to a cement block manufacturing concern, the manager gave the class one hundred cement blocks one-quarter size so that a scaled model could be built for classroom use and observation.

As soon as a boy has decided upon a plan for his outdoor fireplace, a large sheet of wrapping paper is given him upon which he makes his rough draft. After taking a few days to decide on how to present the project and how to work out the balance, shape, and size, the draft is submitted to the teacher for approval. The student is then given a sheet of 12 by 18-in. detail cream or white drawing paper and the project is on its way to becoming a new design of an outdoor fireplace. If the student prefers to reproduce his work on vellum so that blueprints may be made, he is permitted to do so.

Herbert Sorenson states in his book, *Psychology in Education*, page 377.

Mechanical drawing, for example, was accepted in the curriculum by its teachers, not for its vocational value, but because pupils would be trained in perception, would learn to visualize, and would develop a sense of proportion.

The writer believes we are fulfilling this meaningful objective through the outdoor fireplace project. First of all it might be illuminating to ponder for a moment, the word perception as it relates to the project at hand. To perceive, or to have an idea which expresses the situation the student wishes to convey, is to be trained in perception. Ideas are formed from a boundless basis and are continually unfolding to improve mankind and his surroundings. One who is trained for self-expression and escapes teacher domination, applies knowledge toward new ideas and is alert to the application of these ideas. Industrial drawing courses which offer training in perception apply the mechanics of the industrial drawing field. Engineers and architects are supporting this objective each day through progress in science and in the building construction fields.

To give industrial-drawing courses value, new ideas must be allowed to unfold in the student's mind. The mechanics should and will become mechanical and incidental to the over-all objectives when the students are allowed to suggest their own ideas and plan them so they can be put into practice.

The second objective Dr. Sorenson refers to is visualization. To see an object or problem in one's mind's eye in order that the real concept of the object can be seen by the pupil and understood is visualization. It is his idea and he must be able to interpret it to another through symbols called industrial or mechanical drawing.

The third objective of industrial drawing

Fig. 3. Putting the idea on paper; and Fig. 4. Building a model of the design

as to develop a sense of proportion. To convey the idea intended there must be a consideration of factors such as, balance, rhythm, color, space, size, and symmetry. These give the student a sense of proportion which he then applies to the project.

The automobile is by far the largest consumer of motive power from petroleum. — *Petroleum Newsnotes.*

CERAMIC DISHES MADE OVER STONES

VERNON D. SEELEY
Seeley's Ceramic Service
Oneonta, N. Y.

One way to make use of natural resources for your school shop ceramics is by making clay dishes over stones.

Go to the shore of a lake or along a river bed and select some interestingly shaped stones that have been washed smooth by the action of water. By the following process these stones make excellent forms over which to mold your ceramic pieces.

Figure 1 shows a few natural shaped stones ready to be poured. All stones must be smooth, clean, and dry. The dry porous stones act somewhat like plaster by absorbing some of the moisture in the clay.

With a rolling pin and a couple of guide sticks about ¼ in. thick, roll out a slab of clay somewhat larger than the stone. See Figure 2.

Form the clay around the stone as shown in Figure 3. Do this carefully, keeping the clay thickness as even as possible. If this is done slowly and carefully, no cracks will appear. If cracks do appear, smooth them out with a knife or your fingers.

Cut off the excess clay as shown in Figure 4.

Figure 5 shows how to smooth up the outside surface and the edge of the cut with an elephant ear sponge. Do this carefully and thoroughly.

Let the piece dry a few hours or just enough to slightly stiffen the clay. If it starts to dry, it will crack. Carefully remove the dish from the stone. Smooth up any rough spots with the sponge. If you wish to add feet to the dish, it may be done at this time.

Figure 6 shows the dishes ready to be removed from the stones.

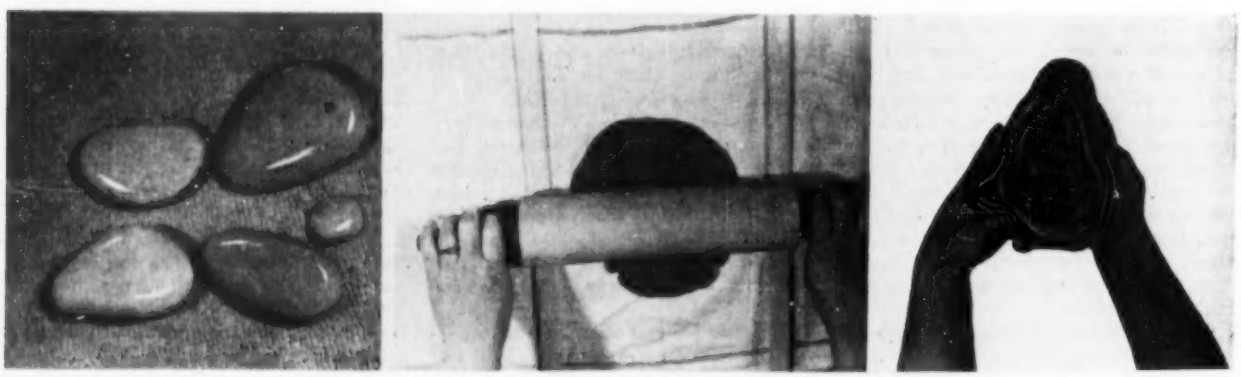


Fig. 1 (at left). Stones that may be used for the forms. Fig. 2 (center). Rolling out the slab. Fig. 3 (at right). Forming the clay around the stone

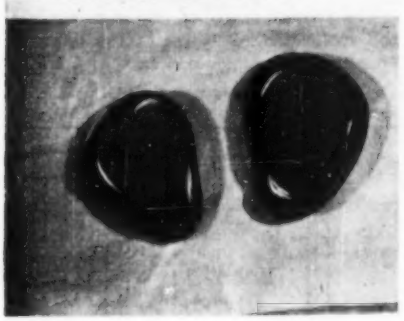


Fig. 4 (top). Cutting off the excess
Fig. 5 (center). Trimming up the edges with an elephant's ear
Fig. 6. The dishes ready to be removed from the stones

The dishes may be decorated in any of the conventional ways. One interesting way is to make the outside color contrast with that used on the inside.

NOTE: If the stone becomes wet after the first try, wash it thoroughly and put it into an oven to dry. A dry warm stone works best.

New potato, called *Delus*, is immune to common races of late blight, according to Department of Agriculture, which recently turned it over to seed producers. Studies show Delus yields as well as other standard Delaware varieties, and will outproduce them in infected areas. — *Industrial Research Newsletter.*

* * *

In 1953, American oil men completed a producing oil well every 20 minutes. — *Petroleum Newsnotes.*

A SCHEDULE BOARD

JOHN A. JARVIS
Dean, Division of Industrial Education
The Stout Institute
Menomonie, Wis.

DICK G. KLATT
Instructor in Metalworking
The Stout Institute

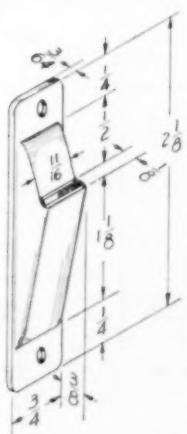
Time-consuming tasks in secondary schools are the annual development of the class time schedule, the teachers' programs, and the assignment of classrooms and laboratories. To assist in the solution of this administrative job, a schedule board was designed and constructed at The Stout Institute. This schedule board has been in use for the past two years and has proved to be an efficient device.

The board as used at Stout is made up of 400 class card holders arranged in four rows and 26 columns on a sheet of three-fourth inch plywood. The column headings include the teachers' names, the subjects taught, and room numbers. The row headings are class hours and may be increased as needed.

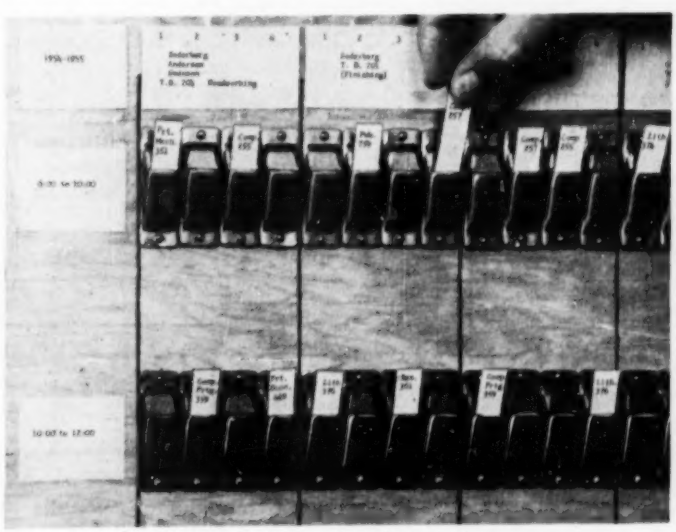
A partial picture of the schedule board is shown. The column and row headings referred to are located at the top and to the left of the board. The class card holders and class cards are shown in the illustration.

The class card holders are made so that a pocket is formed which will hold a class card slip one-half inch wide and two inches long. Typed on each class card slip are the following items of information: (1) subject taught, (2) catalog number, and (3) section number. Any other needed information may be added. Shifting the cards from holder to holder is quickly and easily accomplished and a number of possible program solutions may be tried in a very short time. After a satisfactory program solution is found, the room schedules, the teachers' programs, and the class time schedule may be copied directly from the scheduling board.

After all the adjustments have been made and the school year is safely under way, the board may be placed in the limbo of a storeroom to be dusted off and used again at the turn of the semester.



Details of construction of card holder



A close-up of the schedule board in use

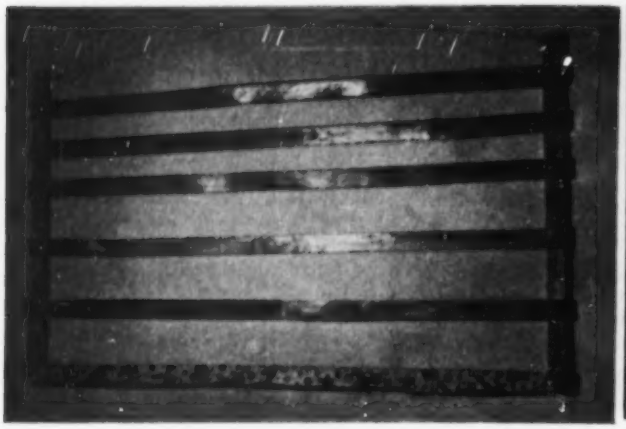
SKEPTICS WRONG ABOUT OKLAHOMA OIL FIELD

After skeptics said that an Oklahoma oil area had played out, one oil company drilled anyway. Today, the field has 77 producing wells and an average production of 1905 barrels a day. Oil men, who must use plenty of guesswork on the presence of oil in a given spot, risk hundreds of thousands of dollars drilling to find it. They are not always so fortunate as the company mentioned. In fact, only one well in nine drilled in new or unproved territory finds oil. — *Petroleum Newsnotes.*

CHRISTMAS-CARD RACK

HARRY L. CROCKETT
Chairman, Industrial Arts Department
Phoenix Union High School
Phoenix, Ariz.

Christmas cards are colorful and most people seek a way to display them. Our method is as follows: take six 4-ft. wood laths and surface one side. Run them over the circular saw and cut a 3/8- to 1/2-in. deep kerf on one edge. Using these as the horizontal members lay them on two laths at right angles, with the saw kerf up. Space the horizontal members to fit the several heights of Christmas cards, when they are slipped in the kerf. Tack the horizontal pieces onto the vertical or side pieces. Stretch a picture wire from the ends of the vertical pieces to hang the



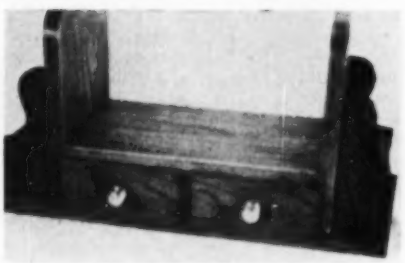
The Christmas-card rack

frame. Cover the bottom strip with paint, or paste on a piece of Christmas wrapping paper. All the others will be covered by the Christmas cards.

Since most people want definite dimensions, try the following: 6 horizontal members 9/16 by 1½ by 48 in.; 2 vertical members 9/16 by 1½ by 28 in.

These racks require little strength to hold their own weight and a display of five dozen cards.

If you don't clinch the nails or if you put it together with screws, the rack can be easily dismantled and bundled for storage.



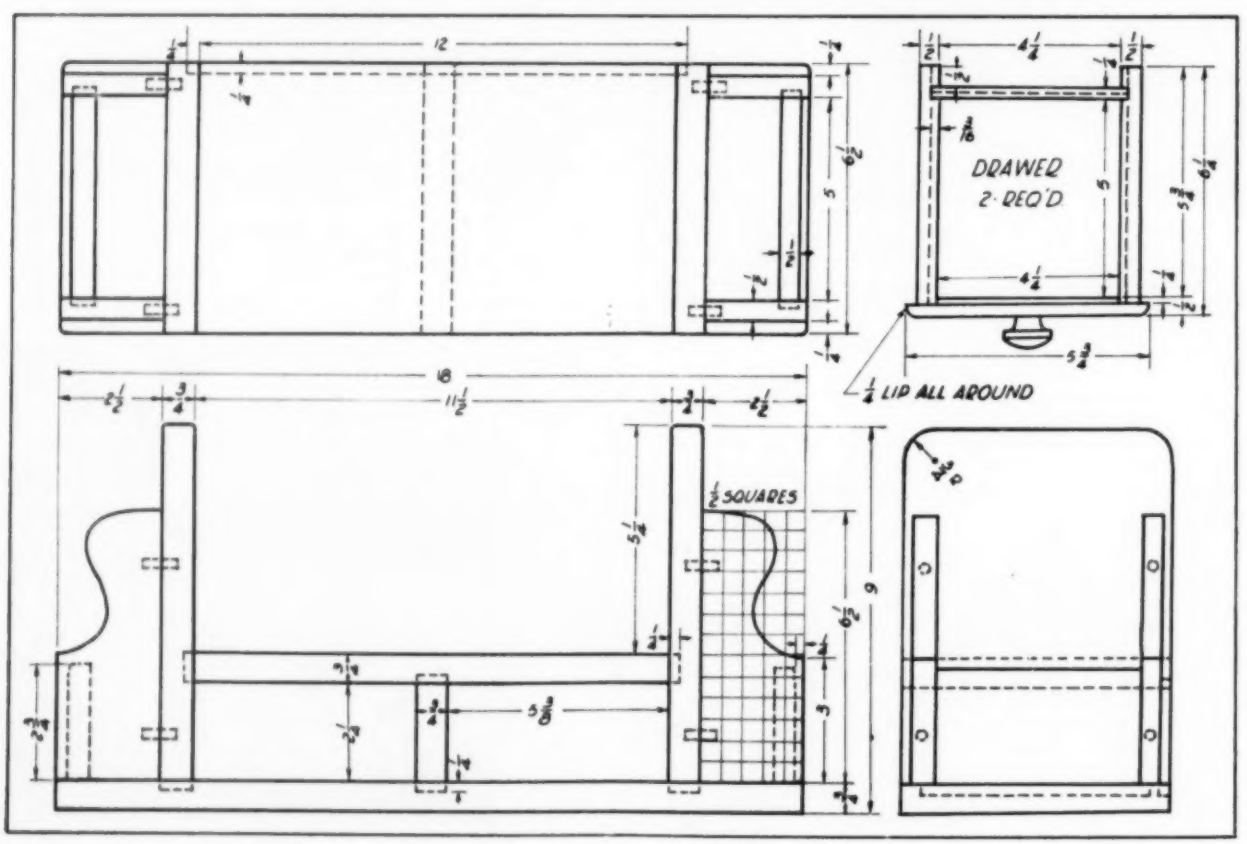
The finished desk bookshelf

DESK BOOKSHELF

EDWARD C. BIEWALD
Ansonia, Conn.

The project described herewith involves the application of a great many different operations. It combines beauty with utility

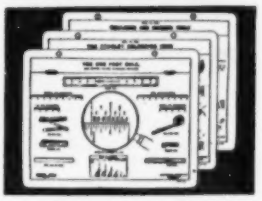
(Continued on page 16A)



Detailed drawing of the desk bookshelf

STANLEY SHOP TALK

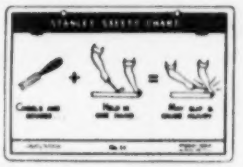
INSTRUCTION CHARTS



Shop teachers find these STANLEY instruction charts real time-savers. They concentrate on show-how to build student know-how. Wordy description is cut to a minimum.

Each chart is printed on both sides of heavy, lacquered, extra large, 25" x 19" cardboard. There are 38 in the set, covering all the woodworking tools and seven of the more commonly used metal working tools. Complete set $6.00. Delivered anywhere in the U. S. A. Use coupon. Send for Tool Guide.

SAFETY CHART



36 charts on 18 cards of 18" x 12" lacquered cardboard. A colorful handling of a serious subject with a light touch and cartoon treatment for high student interest. Each chart is a unit. The complete set provides material for highlighting a once weekly series of tool safety talks during a full school year. Complete set $3.50 postpaid anywhere in the U. S. A.

WOOD CHISELS

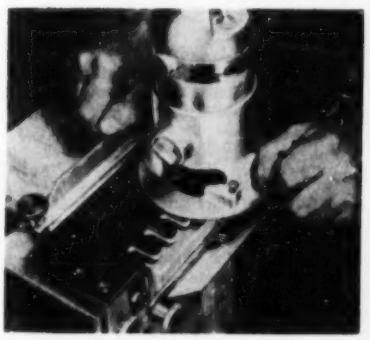
The Stanley Nos. 40 and 50—Sturdy "Boy-Proof" tools that can take hard usage in a school shop. Blade and shank extend in one piece almost through the handle. They're heavier blades, cross ground by machine on both sides. The handles are there to stay. No. 40—4½" blades in sizes ¼" to 2". No. 50—3¼" blade in sizes ⅛" to 2".

"YANKEE" PUSH DRILL

The Yankee "100 PLUS" No. 41. The mechanic's friend, this sturdy all metal tool is ideal for shop use. Bores smoothly with a one-hand drilling action. The drill point in use is locked in. Eight drills from 1/16" to 11/64" (by 64ths) are stored in the magazine handle.

DOVETAIL FIXTURE

The STANLEY No. 61. Used with the versatile and popular STANLEY R8A Electric Router, this dovetail fixture adds cabinetmaker skill to school shop woodworking. The dovetail joint for drawer fronts is cut simultaneously on the front and side piece in a few seconds with the electric router and this attachment. Order the new router manual, *The Router—What It Is and Does*. 38 pages of information with more than 100 illustrations. Regularly 50¢, only 35¢ to schools.



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( ) One set of Instruction Charts at $6.00 postpaid

NAME _____

SUBJECT YOU TEACH or POSITION _____

SCHOOL ADDRESS _____

CITY _____ ZONE _____ STATE _____

DESK BOOKSHELF

(Continued from page 350)

and is a good test of a student's woodworking ability.

The more advanced operations include laying out a curve by the method of squares, constructing mortise-and-tenon joints, constructing dowel joints, and drawer construction. By the use of this project all these operations can be performed with the use of a small amount of material. When completed, it is a useful piece as well as a good learning experience.

The desk bookshelf depicted here was made of cherry. It was finished with a walnut stain and three coats of shellac. The brass knobs are optional for wooden ones would do just as well; however, against the dark background the brass provides a striking contrast which many prefer.

PERSONAL NEWS

(Continued from page 8A)

assume other teacher-training assignments. The trip included stops and informational contacts at Washington, New York, Paris, Beirut, and Karachi on the way to Lahore.

NEW STAFF MEMBER AT TEXAS A & M COLLEGE

Dr. Leslie V. Hawkins joined the industrial education staff at Texas A & M College, effective September 1, 1954, as an associate professor.

Dr. Hawkins taught industrial-arts education for eight years at the Panhandle A & M College, Goodwell, Okla. His prior teaching experience consists of three years in public schools before enlistment in the United States Army where he served as an ordnance officer.

Dr. Hawkins has the B.S. degree from the Panhandle A & M College, the M.S. degree from Oklahoma A & M College and a year ago was awarded the doctor of education degree from Pennsylvania State University where he specialized in industrial education and guidance. He is the past president and secretary of the Panhandle Oklahoma Industrial Arts Association, president, Oklahoma Industrial Arts Association, and during the past year served as vice-president of the Oklahoma Vocational Association. He is a member of several educational societies and fraternities, including Phi Delta Kappa, Iota Lambda Sigma, Oklahoma Industrial Arts Association, American Industrial Arts Association, Oklahoma Vocational Association, and the American Vocational Association.

INDUSTRIAL EDUCATION GRADUATES

Twenty-two men obtained master's degrees in industrial education from the University of Missouri during the 1953–54 school year and eight men received their doctor's degrees in this area. The doctoral degree graduates are as follows:

Pat H. Atteberry, newly appointed chairman of Department of Industrial Arts, Western Washington College of Education, Bellingham, Wash.

Walter C. Brown, Associate Professor of Industrial Education, University of Missouri, Columbia, Mo.

Oscar E. Kjos, Professor of Industrial Arts, Northern Montana College, Havre, Mont.

Floyd E. Krubeck, Assistant Professor of Industrial Education, Southern Illinois University, Carbondale, Ill.

Alfred H. Moore, Teacher of Industrial Arts and Special Education, Fremont High School, Oakland, Calif.

Hugh L. Oakley, head, Department of Industrial Education, Murray State College, Murray, Ky.

Theodore E. Wiehe, head, Department of Machine Shop, The Stout Institute, Menomonie, Wis.

Lawrence S. Wright, Assistant Professor of Industrial Arts, Iowa State Teachers College, Cedar Falls, Iowa.

GARDNER BOYD APPOINTED SUPERVISOR OF INDUSTRIAL ARTS

Gardner Boyd has been appointed supervisor of industrial arts in the public schools of Kansas City, Mo.

He received his B.S. in education from Central Missouri State College, Warrensburg, Mo., and his master's in industrial education from the Colorado State College of Education.

He taught for ten and one-half years in the public schools of Kansas City as instructor of industrial arts in elementary, junior, and senior high schools. He served as instructor of crafts and metals at Central Missouri State College and at Penland School of Handicrafts, Penland, N. C. He was teaching metals at Central High, Kansas City, Mo., at the time of his appointment.

After completing an officer's training course during World War II he served in the Pacific on a destroyer, where his duties included educational training of the ship's personnel. He was transferred to Great Lakes where for 18 months he was officer in charge of the Basic Engineering school with 2000 students and 120 instructors. Subsequently he was transferred to Washington, D. C., and assigned to Educational Services and was responsible for organizing a trade for naval personnel training.

Mr. Boyd's vocational training includes eight years as a printer and summers as a tool and gauge worker.

He is currently president of the Missouri Industrial Education Association and editor of a monthly column for the magazine *Profitable Hobbies* in which he conducts a question and answer series and designs a project and gives instruction for completing it.

Mr. Boyd is 39 and married.

J. J. ELLIS RETIRES

J. J. Ellis, Supervisor of industrial arts in the public schools of Kansas City, Mo., retires after 51 years of service as a teacher of industrial arts and as an administrator.

Mr. Ellis received his training in the public schools of Kansas City and the University of Missouri, University of Kansas, University of Chicago, and Colorado State College at Fort Collins, where he received his degree.

He began his teaching as an instructor of metal forging at Manual Training High School in 1903. In 1909 he went to the University of Kansas to teach metals in the College of Engineering. After two years in this school he returned to Manual Training High. In 1917 he became the first teacher trainer for industrial education in Missouri. He served as teacher of industrial arts at Northeast High School, vice-president at Northeast High, Lathrop Polytechnic Institute, and Manual High and Vocational school.

In 1950 Mr. Ellis was appointed supervisor of industrial arts where he remained until his retirement in June, 1954.

He expects to spend his time in his suburban home growing flowers and working in his very fine shop.

♦ Dr. Chris H. Groneman, head of industrial Education at the Texas A & M College, and Professor Emanuel E. Ericson in the University of California at Santa Barbara, served as guest professors in the graduate program in industrial arts education for the 1954 summer session at the Colorado State College of Education in Greeley, Colo.

♦ James Mezzano, Jr., industrial-arts instructor at Wakefield High School, Wakefield, Mich., for the past 11 years, was recently appointed superintendent of the Marenisco School, Marenisco, Mich. Mr. Mezzano, a graduate of The Stout Institute, Menomonie, Wis., received his master's degree from the University of Michigan in 1953.

♦ John M. Pollock received the Ed.D. degree from Peabody College, Nashville, Tenn., on August 16, 1954. The title of his dissertation was "Administration of Educational Services in Georgia."

Mr. Pollock has returned as assistant professor in the industrial-arts department at the University of Georgia, Athens, Ga.

♦ Willis G. Labes has been appointed associate professor of fire protection and safety engineering at Illinois Institute of Technology, Chicago, Ill.

♦ Dr. C. Robert Hutchcroft, formerly professor of industrial-arts education at State University of New York Teachers College, Oswego, N. Y., took up his duties at the University of Michigan, Ann Arbor, Mich., at the beginning of the school year in September with the rank of associate professor of industrial-arts education.

This position was created for the purpose of making available increased services for industrial-arts teachers, supervisors, and teacher trainers.

Professor Hutchcroft will teach courses for undergraduates and graduate students, direct research of graduate students, and provide needed field services for industrial-arts teachers, supervisors, and administrators.

♦ Rodger D. Blomgren has taken a leave of absence from the industrial-arts department of Illinois State Normal University and is working toward the doctorate in industrial education at the University of Illinois.

♦ Ozzie B. Payton, of Laurel, Miss., has accepted a position as graduate assistant in the department of industrial education at the University of Illinois, where he is working toward the master's degree in industrial education.

♦ Dr. H. O. Reed has resigned his position as associate professor of industrial arts at Illinois State Normal University to accept an appointment as head of the industrial-arts department at Iowa State Teachers College, Cedar Falls, Iowa. Dr. Reed has had a wide range of professional experience in the public schools and colleges of Illinois. He completed the doctorate in industrial education at the University of Illinois in 1948.

♦ Leonard Daugherty, supervisor of industrial arts, Board of Education, Louisville, Ky., is retiring after 39 years of service in the Louisville public schools.

♦ Dr. John A. Jarvis, dean of industrial education, The Stout Institute, Menomonie, Wis., served one week during the summer in Washington, D. C., where he acted as an expert consultant to the Chief of Naval Personnel.

Dr. Jarvis was part of a team of civilian consultants reviewing and evaluating research and development groups. Dean Jarvis gave much of his time to reviewing and evaluating the work of the Personnel Analysis Division in the field of personnel research into training.

♦ Guy O. Tolleud has been appointed director of school buildings, Minnesota State Department of Education. He served as supervisor of occupational information and guidance for Minnesota for the past seven years.

Get adequate, comfortable sound throughout your auditorium with this superb 16mm. portable Pageant Projector

"CAN'T-HEAR-BACK-HERE" troubles are a thing of the past with the Kodascope Pageant Sound Projector, Model AV-151. This finest of all Pageant models has a powerful 15-watt amplifier and an extremely well-baffled 12-inch speaker. Together, they can fill auditoriums about as big as they come with clear, undistorted sound.

And when conditions require specialized sound distribution, that's easily available, too. The Kodak Multi-Speaker Unit—three matched 8-inch speakers in a single case—inexpensively converts the Pageant into a 4-speaker sound system, capable of coping with virtually any acoustical condition.

You have full control over the quality of sound reproduction, too. Separate bass and treble controls enable you to compensate for the "boominess" or "deadness" of a room. And the unique Fidelity Control lets you precisely focus the sound-scanning beam to make the most of any 16mm. optical-sound track, regardless of its position.

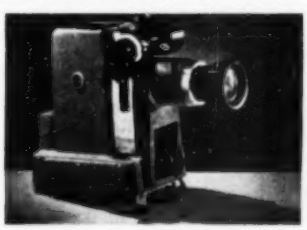
And that's not all . . .

Visual quality to equal the excellence of the sound is provided by a field-sharpening element built right into the lens. Matchless dependability and convenience of maintenance are assured by permanent pre-lubrication, an exclusive feature with Kodascope Pageant Sound Projectors. This completely eliminates the danger of under- or over-oiling, chief causes of mechanism breakdown. And amazingly quiet operation is the happy result of some ingenious new departures in projector design and construction.

Best of all, perhaps, you pay no premium for Pageant excellence. There are six different Pageant models designed to meet varying 16mm. projection requirements . . . and each is remarkably low in price! The Kodascope Pageant Sound Projector, Model AV-151, is only $495 complete with separately cased Kodak De Luxe 12-inch Speaker. And other Pageant models start at just $425.

Your Kodak Audio-Visual Dealer will be glad to help you choose a Pageant that fits your specific needs exactly. Or just mail the coupon for more detailed information.

Prices subject to change without notice.



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It's completely new! And it has the *smoothest, surest, fastest* film-advance ever designed!

For *brighter, sharper* pictures, it has the Kodak Ektanon Projection Lens (f/3.5 or f/2.8), Lumenized lens-and-condenser system, and aluminized glass reflector. Shows 2x2 slides as well as filmstrips.

Only $98, with f/3.5 lens. Ask your dealer to demonstrate its amazing efficiency.

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"Our experience indicates clearly that hit-or-miss lubrication is the chief cause of damage to school projection equipment. The Pageant Projector's permanent pre-lubrication totally eliminates this problem—and we're happy to endorse it."

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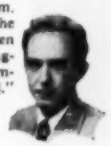
Baum's Sporting Goods, Inc.
Sunbury, Pa.

"The main problem in the use of 16mm. sound equipment is maintenance. The primary maintenance problem has been over- or under-oiling. Because the Pageant eliminates this difficulty, it is becoming the most popular projector in the field."



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Arax Photographic Company
Poughkeepsie, New York

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Please send name of nearest Kodak Audio-Visual Dealer and information on Kodascope Pageant Sound Projectors.

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(Zone)

12-193

Gulf Coast refineries produce enough gasoline daily to run 25,500 cars around the world at the equator each day.—*Petroleum Newsnotes.*

News Notes

♦ The Western Pine Association research laboratories announced the development and release to approved manufacturers of a special formula for making a combination primer and knot sealer to be used in painting knotty grade woods.

The formula, designated WP-578-P, is a further development of the universally used clear sealer WP-578 the laboratory released several years ago.

The new formula makes it possible that the primer and sealer may be applied in one application.

Information concerning names of manufacturers of both the clear sealer and the primer sealer may be obtained by writing the *Western Pine Association, 510 Yeon Building, Portland 4, Ore.*

♦ The 1954 edition of the National Safety Council's statistical yearbook, "Accident Facts," is now off the press.

"Accident Facts" contains facts and figures on all types of accidents — industrial, traffic, home, farm, and school.

The 96-page book is priced at 75 cents a single copy and less for quantities. Inquiries should be sent to the *National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.*

♦ The National Safety Council announces two new safety films, "Take Time to Live" and "If You Took Your Family to Work."

These films run 12 minutes each and are available in 16mm. sound movies and 35mm. sound slidefilms.

For further information and prices, write the *National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.*

♦ Four scholarships have recently been made available for industrial-arts students at Kent State University, Kent, Ohio. Two of them are furnished by the Carter-Jones Lumber Company, Akron, Ohio; one by Arden S. Ruttan of the local Ford agency; and one by the Campus Supply Company of Kent, Ohio.

♦ The National Association of Manufacturers have published a new booklet that answers the question: What is the NAM and what does it stand for?

This brochure is informative on the broad philosophy underlying all NAM policies and on industry's views on such specific subjects as our patent system, the conservation of America's resources, competition, employer-employee relations, the need for curbing Federal Government spending, tax reduction, greater state and local responsibility, profits, foreign trade, and education.

The book is useful as background information. Write to *Leslie Avery, director, public information division, National Association of Manufacturers, 2 East 48th St., New York 17, N. Y.*

♦ The District of Columbia board of education authorized Capitol Radio Engineering Institute to confer the degree of Associate in Applied Science to resident school graduates who complete a specialized college level course now being offered.

Founded in 1927, this institute is recognized as one of the nation's leading technical schools, offering a wide selection of home study and residence courses in radio, television, and electronics.

In addition to technical studies of broadcast, television, and electronics engineering, the CREI course, by which students earn the A.A.S. degree, includes studies in science and mathematics, American Government and English.

♦ An excellent opportunity for high school students throughout the U. S. and its territorial possessions to exercise their creative talents and to express themselves through photography, is now being offered through the 10th Annual (1955) National High School Photographic Awards, sponsored by Eastman Kodak Company. It has the approval of the Contest Committee of the National Association of Secondary School Principals.

Providing a total of $5,000 in cash prizes, the 1955 awards are open to students in daily attendance (grades 9–12) at any public, private, or parochial high school in the United States and its territories. There is no limit to the number of photos an entrant may submit.

Full information about the awards and the traveling salon may be obtained from the *National High School Photographic Awards, 343 State Street, Rochester 4, N. Y.*

♦ The United States Civil Service Commission has announced an examination for production specialist for filling positions in Washington, D. C., and vicinity, principally in the Department of the Navy. The salaries range from $5,060 to $10,800 a year.

From 8 to 10 years of appropriate experience is required. No written test will be given.

Full information regarding the examination, and application forms, may be secured at many post offices throughout the country, or from the U. S. Civil Service Commission, Washington 25, D. C. Applications will be accepted by the *Board of U. S. Civil Service Examiners, Department of the Navy, Main*

(Continued on page 21A)

Over 150 voltage combinations
. . . are possible with G-E Rectifier Transformers, from 1 to 700 volts, when using buck-boost connections. Specially designed for industrial electronics experiments, complete internal wiring diagrams and polarities are shown on the nameplate. 0.4-kva windings provide sufficient capacity for most educational purposes. Write for bulletin GEC-776 to General Electric Co., Sect. 688-10, Schenectady, N. Y.
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Draftsmen, engineers, designers, architects, looking for quality and reliability, have recognized K&E Leadership for 87 years. That is why K&E is their first choice for the tools and materials they work with.

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When you are considering your new requirements or replacements consult the K&E 1954-55 School Catalog.

Have you had your copy? We shall be glad to send it to you or give you any information about K&E if you will drop a line to Keuffel & Esser Co., Hoboken, N. J.

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Train your students to use Foley machines. They will do better work with Foley sharpened saws. Foley equipment is safe to operate and is widely used by hundreds of schools, colleges, industries, Army, Navy, Air Force, etc.

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You can sharpen 4 to 6 hand saws per hour with these three Foley Automatic power machines — Retoother, Saw Filer, Setter.

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Foley Saw Sharpening Machines have proven their value for making physically handicapped persons self-supporting in their own business. Write us for full details.

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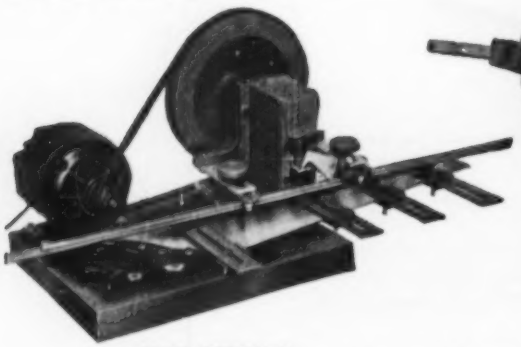
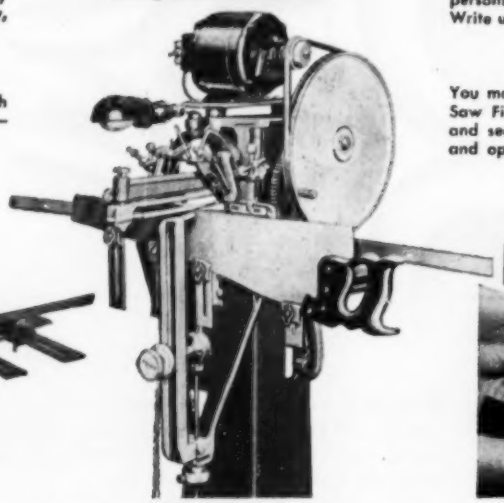
You may have the privilege of using a Foley Saw Filer in your own shop for 30 days, — and see for yourself its training advantages and operating economies. Ask us about it.



FOLEY RETOOTHER
Cuts new teeth in old saws (either straight or crowned edge) in one run through machine.



FOLEY SAW FILER
Files hand, band and cross-cut circular saws with machine accuracy. The saw is clamped in carrier which feeds it through all 3 machines for retoothing, filing, setting.

FOLEY SETTER
For both hand and band saws. Sets teeth on both sides in ONE run with perfect machine accuracy.

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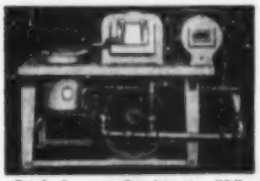
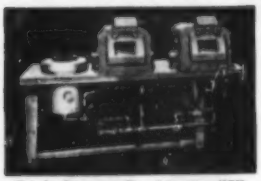
THE BEST INDUSTRIAL FURNACES MADE

THOUSANDS OF THESE SUNBEAM STEWART FURNACES ARE IN THE VOCATIONAL DEPARTMENTS OF TECHNICAL SCHOOLS



Triple Purpose Combination "D"



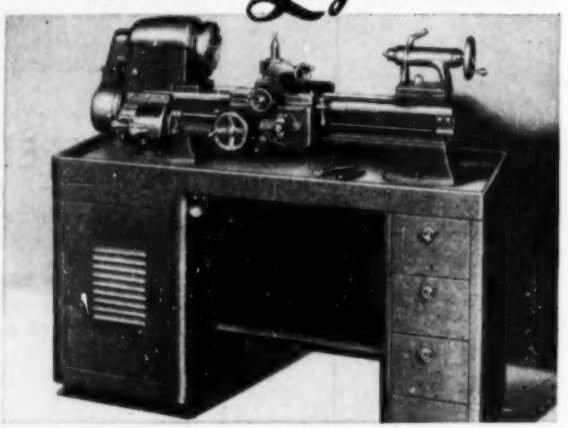
Triple Purpose Combination "E"

Because Sunbeam Stewart units have been designed for efficient production heat treating in small shops and tool rooms, they are widely recognized as standard equipment for all types of industrial heat treating and vocational training work. To provide complete heat treating facilities for training purposes Sunbeam Stewart especially designed combination units, shown at left.

For student instruction and reference, write for free "Guide to Furnace Selection." Aids in determining the type of furnace best suited for any work. Also ask for Data File on school units.

SUNBEAM CORPORATION (Industrial Furnace Division)
Main Office: 4433 Ogden Ave., Dept. 114, Chicago 23, Ill.

Plan better shop projects with this 11" *Logan* LATHE



Students enjoy the industrial type projects that are easily handled on this industry-proven 11" lathe with 1" collet capacity, 1⅜" spindle hole, and 24" centers. Rugged, accurate, simple and safe to operate, it is an ideal school shop lathe. The ball bearing spindle mounting needs no adjustment between 45 and 1500 rpm. The rugged bed has two V-ways and two flat ways precision ground. The automatic apron has a convenient, lever-operated disc-type clutch. V-belt drive, headstock, countershaft and motor are enclosed. Priced to stretch your budget dollar. Write for the Logan Lathe Catalog.

LOGAN ENGINEERING CO.
LAWRENCE AND LAMON AVE., CHICAGO 30, ILL.

NEWS NOTES

(Continued from page 18A)

Navy Building, Washington 25, D. C., until further notice.

♦ The National Association of Manufacturers has published a booklet — "Our Public Schools and Their Financial Support" — which shows that educational facilities are not keeping pace with the growth in population or with the rise in national income.

It is based on a study, made by a committee of educators and industrialists who worked with the NAM's Education Department, to show that the public schools face even greater influxes of new pupils in the years ahead than in the years since the war.

Enrollments in public elementary schools rose by less than 4½ million in the past eight years, the report noted. But in the next two years, it pointed out, a 2,400,000 increase is expected and by 1958 the total may reach 26 million, or 4 million above the number now in school.

Schools, both elementary and high, may get copies of this booklet by writing to the *National Association of Manufacturers, 2 East 48th St., New York 17, N. Y.*

♦ A graphic language for all concerned with electrical diagrams has been published as a new American Standard — Y32.2–1954. Standard is a complete revision and co-ordination of five American Standards for graphical symbols. Publication is for use of electrical engineers, designers, manufacturers, and installers of equipment to show the interconnections and functioning of electrical circuits. Project sponsored by American Institute of Electrical Engineers, American Society of Mechanical Engineers.

American Standards Association, Inc., 70 East 45th St., New York 17, N. Y.

♦ The board of education, Dertoit, Mich., has given the green light to educational television in Detroit with the appropriation of $104,000 to install studios at Wayne University and at the Detroit Public School Radio Station, WDTR-FM, Lawton at Joy.

Wayne will spend $75,000 converting its Old Main auditorium, until recently occupied by the library, while WDTR will use $29,000 to alter its radio studios for TV presentation. A third studio will be built by the University of Detroit.

All three studios will be used by the 18 cultural and educational groups who are members of the Detroit Educational Television Foundation, sponsors of the nonprofit, noncommercial UHF station. The Foundation has raised nearly $400,000 from private sources which will be used to build a 500-foot tower and purchase a transmitter, television cameras, kinescope, and allied equipment.

"Channel 56 should be on the air within six months," according to Wayne Vice-President William E. Stirton, who is executive secretary of DETF.

♦ The free-loan color motion picture "Flamefoil Canvas Protection" is once again available through The Princeton Film Center, Inc. A dramatic demonstration of the safety and serviceability features of fire, mildew, and water resistant canvas which may be utilized in industrial or public service operations; features which the film clearly illustrates under varying climatic conditions and situations.

This film is sponsored by The Philadelphia Textile Finishers, Inc., and is available free-loan from *The Princeton Film Center, Inc., Princeton, N. J.*

♦ A booklet, *"Movies for Meetings,"* describing 43 free-loan 16 mm. sound motion pictures suitable for clubs, industrial plants, church societies, and other adult community organizations is available free from Association Films.

These films cover such subjects as travel, health and safety, sports, "do-it-yourself" skills, and a series of dramatic documentaries about real people and places. The films are presented as a public service by leading industries, foundations, and associations. They may be borrowed from the regional libraries of Association Films.

Copies of *"Movies for Meetings"* may be had by writing *Association Films, 347 Madison Ave., New York 17, N. Y.*

♦ The American Film Forum has released Forum No. 11 entitled "Do Security Regulations Hamper Science?"

This film features Congressman Thomas Burke of Missouri and Prof. John S. Toll, of the University of Maryland, discussing this vital subject which arose from the recent Oppenheimer case.

The moderator in all Forums is Marquis Childs, well-known columnist and commentator.

Forums are available on a rental, subscription basis to schools, educational institutions, and adult groups.

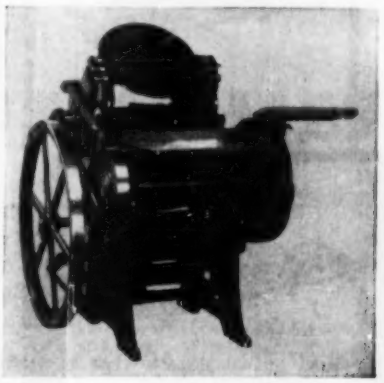
American Film Forum, Inc., 516 Fifth Ave., New York 36, N. Y.

♦ An experimental ultra high frequency television transmitter was given to Santa Barbara College of the University of California by Edwin W. Pauley, a regent of the University. Regent Pauley also provided $5,000 a year for the next three years for the installation, maintenance, and operation of the equipment.

The transmitter is now being installed on the Santa Barbara College Mesa campus and will be used for research, experimental, and teaching purposes by the industrial-arts and physical sciences departments as well as other

(Continued on next page)

C & P NEW SERIES PRESSES These presses in sizes of 8x12, 10x15, 12x18 and 14½x22, provide the student with equipment that furnishes all practical requirements of hand fed press operation. May be equipped with flywheel, belt and platen guards. Also furnished for treadle operation instead of motor drive.



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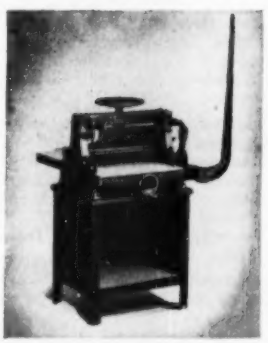

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C & P presses and paper cutters have been standard equipment in commercial plants and schools for over 50 years. So, the selection of C & P equipment for printing classes places before the students *practical* equipment exactly as used in commercial practice in the entire printing industry.

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For practical instruction—for safety in use—the foresighted administrator recommends . . . Chandler & Price.

"HANDBOOK OF PLATEN PRESSWORK" *is one of the outstanding aids to printing furnished without charge to printing instructors. If you do not have a copy, just request one.*

C & P PILOT PRESS A thoroughly efficient little press, chase 6½x10, that teaches basic principles of press operation with exceptionally fine printing results.

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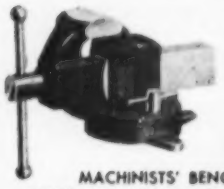

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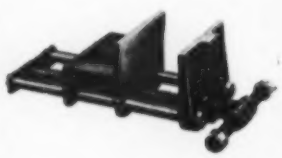
Solid Jaw and Swivel Base



18-A DUAL PURPOSE
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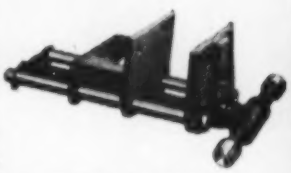

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NEWS NOTES

(Continued from previous page)

interested groups. It is also planned to originate occasional closed circuit transmissions with sufficient flexibility to permit college radio and television classes to study TV production techniques.

The unit consists of a television camera, receivers, testing equipment, spare parts, and the large transmitter itself. The equipment was originally designed and built by electronics engineers, under the supervision of Larry Reed, to transmit television signals for test purposes. In that way it contributed to the improvement of circuits used in transmitting signals in the UHF band.

The transmitter was previously installed at the top of the St. Francis Hotel for the sending of test patterns. Because of the high frequency employed in this experimental unit, operating in the region of UHF channels 40–52, it will be used for closed circuit transmissions only in the near future.

♦ Oklahoma City University has established a School of Industrial Arts offering courses leading to a degree in that field to replace its Technical Training School and to expand the industrial-arts program.

The new curriculum which leads to the bachelor of industrial-arts degree went into effect with the beginning of the fall semester this year.

To receive the BIA, a student takes a certain amount of liberal arts work along with his specialized field of industrial arts. Ten different majors are offered, including: refrigeration, drafting, automotive, diesel, radio and television, auto body and paint, woodwork, welding, electricity, and industrial-arts education.

♦ A new law signed by President Eisenhower on August 20 gives post-Korean veterans three years from the date of their discharge to start their education under the G.I. Bill of Rights. Disabled veterans get a four-year extension in their deadline for completing training. The law previously allowed a veteran two years.

♦ The slow learner is getting more attention than the rapid learner. At least this is true in a sampling of junior and senior high schools studied by the U. S. Office of Education. Results of the study are summed up in a new Federal Bulletin (1954, No. 5). It is entitled *Teaching Rapid and Slow Learners in High Schools.*

♦ A little fun now and then, mixed with the serious work of study, was indulged in this summer by students in the industrial-arts department of the summer school at Colorado State College of Education at Greeley, Colo., where 2845 were enrolled. The summer school enrolled 121 students studying at the graduate level in industrial arts.

A "Liars Bench" was installed in front of the industrial-arts building for use during class intermissions with sections set aside for beginners, school administrators, and for professors. At extreme right in the professorial section is Dr. Clarence T. Baab, professor of industrial arts at the college in Greeley.

The **liar's bench** at Colorado State College of Education

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- CONSTRUCTION
- APPEARANCE
- DURABILITY
- PRICE

WENCO 4-STUDENT STEEL LOCKER BENCH

The WENCO 4-Student Steel Locker Bench was designed specifically for maximum efficiency and durability. Its sturdy steel olive green sides are solid — no divisions or openings to admit sawdust or shavings. Twelve roomy steel lockers provide ample storage space with each door equipped with padlock attachments. Like all WENCO Benches, its attractive top is made from the finest grade of Northern Hardrock Maple to assure years of resistance to daily use. Dimensions: Top — 64" x 54" x 2¼". Height — 33 13/16". Shipped knocked down with necessary hardware and instruction for easy assembly.

SEE THIS POPULAR BENCH AT OUR A.V.A. EXHIBIT IN SAN FRANCISCO, DECEMBER 2 - 7. *BOOTHS 35 and 36.*

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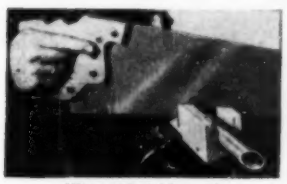
Teach Metalcraft in Your Woodworking Shop

Without Spending a Dollar for Tools!

CUTTING
REYNOLDS *Do-It-Yourself* ALUMINUM

Cutting tubing with jig saw.



Miter-cut in tubing with ordinary wood saw.

Do-It-Yourself Aluminum sheeting being cut with household scissors.

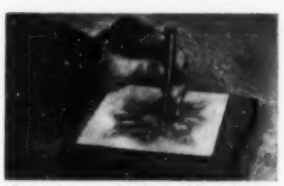
BENDING
REYNOLDS *Do-It-Yourself* ALUMINUM

Bending tubing with simple work bench jig.

Rolled edge made with slotted dowel or broom handle.

Bending sheet with slotted piece of wood.

FINISHING
REYNOLDS *Do-It-Yourself* ALUMINUM



Embossing may be done with nail sets, punches and ball peen hammer.

Applying asphaltum for chemical etching.

Developing design by use of abrasive.

REYNOLDS *DO-IT-YOURSELF* ALUMINUM
consists of:
TUBING • RODS • BARS • ANGLES • PLAIN SHEETS • EMBOSSED SHEETS SCREEN AND STORM SASH SECTIONS • FASTENERS • TRIM STRIP WINDOW HARDWARE • REYNOLON PLASTIC FILM

REYNOLDS

*Do-It-Yourself** ALUMINUM

...as easy to use as wood with just woodworking tools!

You can practically double the teaching value of your standard woodworking tools, both hand and power. Reynolds *Do-It-Yourself* Aluminum, specially engineered for workability, makes dozens of operations astoundingly easy to teach. Think of it. Your students can cut, bend, shape, saw, plane and joint Reynolds *Do-It-Yourself* Aluminum with only the woodworking tools you already have.

Turns out beautiful finished products, too, in gleaming, long-lasting, rustproof aluminum. Use Reynolds *Do-It-Yourself* Aluminum for all your classes from beginners to the most advanced. Send a post card for complete information on this amazing new material.

WOODWORKING TOOLS are all you need for Reynolds *Do-It-Yourself* Aluminum. Use standard hand or power woodworking tools to cut, bend, shape or smooth it.

CAUTION: This new material is approved by leading tool makers. You are cautioned, however, to use only Reynolds *Do-It-Yourself* Aluminum because other types of aluminum may harm tools.

*T. M. Reynolds Metals Company

WRITE FOR INFORMATION
free "how-to" booklet and description of easy-to-follow plans. Address:

REYNOLDS METALS COMPANY
2479 South Third Street, Louisville 1, Kentucky

New Publications

American Technical Society's Drafting

By J. W. Giachino and Henry J. Beukema. Cloth, 243 pp., 6¼ by 9¼ in., illus., $3.80. American Technical Society, Chicago, Ill.

A fine text which will acquaint the student not only with the basic principles of drafting but also how to apply the facts acquired to such occupations as woodworking, machine-shop practice, structural iron and welding, sheet-metal layouts, pictorial drawings, home planning, electrical diagrams, pipe layouts, and graphs and charts.

The book also contains a chapter on occupational opportunities in drafting.

All About Power Tools

Edited by Floyd Mix. Paper, 192 pp., 5⅞ by 8½ in., illus., $1. Goodheart-Willcox Co. Inc., Chicago 5, Ill.

A useful book for beginners, students, and homecraftsmen.

It explains how to use the circular, radial-arm, and portable electric drill, power grinder for tool sharpening, the jointer, band saw, portable sander, wood and metal lathe, and wood shaper.

The book also describes how to do spray painting.

Practical Metal Spinning

By H. C. Haag. Paper, 24 pp., 5½ by 8½ in., illus., 75 cents. Haag Machine Co. Inc., Hawthorne, N. J.

A small brochure but a very instructive one. The book explains the terms used by spinners, then describes the tools used in the actual spinning.

Next is a chapter on chucks and chuck making, and then a description on how to prepare the blank. An explanation of the spinning process follows with a good description of what speed to use and how to trim and manipulate the spinning tool and the backstick. The prevention of wrinkles, and the rolling of the final bead also is carefully explained.

Masterpieces of Furniture

By Verna Cook Salomonsky. Cloth, 224 pp., 8 by 11 in., 102 photographs and 500 drawings, $6. Dover Publications, Inc., 1780 Broadway, New York 19, N. Y.

This is the revised edition of a former book published under the name "Masterpieces of Furniture Design."

It contains 102 photographs and over 500 drawings accompanied by explanations of the traditions and environment which prompted the making of the various pieces.

Many of the drawings and photographs show pieces from collections in the Metropolitan Museum of Art, Boston Museum of Fine Arts, and the Museum of the Rhode Island School of Design.

The book also contains a very extensive bibliography.

How to Use Meters

By John F. Rider. Paper, 140 pp., 5½ by 8½ in., illus., $2.40.

Picture Book of TV Troubles Vol. 1

By John F. Rider. Paper, 70 pp., 5½ by 8½ in., illus. $1.35. Horizontal AFC-oscillator circuits.

How to Use Test Probes

By Alfred A. Ghirardi and Robert C. Middleton. Paper, 176 pp., 5½ by 8½ in., illus., $2.90. John F. Rider Publisher, Inc., 480 Canal St., New York 13, N. Y.

Three of Rider's excellent books on TV and radio servicers on installation and repair.

Machinery's Handbook

By Erik Oberg and F. D. Jones. Fifteenth edition. Leatherette, 1911 pp., 4½ by 7 in., illus., $9. The Industrial Press, New York 13, N. Y.

Over 1,000,000 copies of *Machinery's Handbook* have been printed in 14 editions since it first appeared in 1914. The new fifteenth edition, now ready for use, makes available the recent and basic information, data, and formulas that the handbook user in the mechanical field needs to keep abreast of current developments.

Of particular interest in the fifteenth edition are a revised and rearranged spur gear section and an entirely new section on generated bevel gears.

A new section on fine-pitch worms and worm gears also has been added in which the step-by-step design procedure is outlined and formulas are given for obtaining profile and pressure angle corrections for cutters and grinding wheels used to produce fine-pitch worms.

Additions to the section on honing include formulas and data for determining the proper rotative speeds, recommended tolerances, allowances for stock removal, and possible adjustments for eliminating undesirable conditions. New data on nickel and nickel alloys, titanium and titanium alloys, and copper-silicon and beryllium alloys also are presented.

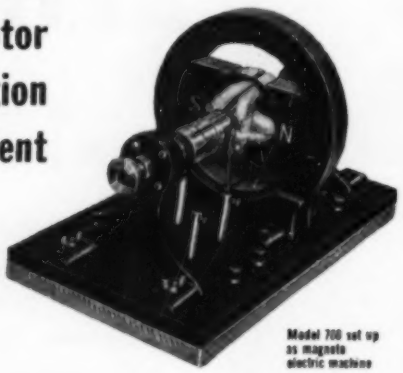
(Continued on page 26A)

NOW

...teach DC-AC motor construction and operation by Visual Experiment

with CROW ELECTRI-KIT model 700

ROTATING ELECTRIC MACHINE



Model 700 set up as magneto electric machine

For the first time—a kit so simple, so practical that high school students can grasp the principles of electric motors, generators and alternators readily. Assemblies built from Model 700 components perform exactly like commercial machines, yet the kit's ingenious design makes it amazingly easy to assemble and operate.

- Same basic parts—baseboard, frame ring, axle and bearings—are used in every experiment.
- Kit can be used anywhere . . . no special wiring, floor space or floor load problems.
- Safe—cannot shock. Operates on six to 110 V. DC or 110 V. 60-cycle AC.
- Motors can be assembled and disassembled with only a screwdriver.
- Students see all parts and coils in operation at all times.

NEW, COORDINATED TEXT-MANUAL MAKES COURSE EASY TO TEACH, EASY TO LEARN!

- Completely new. 270 pages, 65⅝ pictures.
- Reduces theory, assembly and operation of rotating electric machines to simplest possible terms. Course can be taught easily by instructors with very limited electrical training.
- Divides each experiment into four sections:
  1—Discussion of theory involved.
  2—Demonstration by instructor.
  3—Step-by-step instructions for assembly of machine.
  4—Comprehensive pictorial review.
- Assemblies cover 25 machines including . . .
  Permanent magnet generators and motors
  DC series shunt and compound generators and motors
  Commutation and interpoles
  One, two and three phase AC motors and alternators
  Maintenance and trouble shooting

On a cost per experiment basis, the Crow Rotating Electric Machine is by far the most economical equipment you can buy.

Write for complete details and prices

CROW ELECTRI-CRAFT CORP.

DIV. OF UNIVERSAL SCIENTIFIC CO., INC. • BOX 336G, VINCENNES, INDIANA

Teacher-student teams share in $50,000 awards program!

Ronald Goyke (right) shows his Outstanding Achievement Award-winning buffet table to his instructor, Mr. George Robertson (left), and Mr. Dewey Barich, Ford Motor Company official. Goyke and Robertson were among 31 top-winning teams in the 1954 IAA program.

DETROIT, November 10—"Teachers did a wonderful job in making our 1954 Industrial Arts Awards program, the most successful in its 8-year history," said Dewey Barich, manager of Ford Motor Company's Educational Relations Department.

"Of the over 20,000 student-made school projects judged regionally," Barich continued, "a total of 5,039 were received in Dearborn for the finals. Quality of craftsmanship was the finest we have seen. The use of greater imagination was especially evident."

Barich explained that 31 teacher-student teams, winners of Outstanding Achievement Awards, enjoyed an all-expense, 3-day trip to Detroit and Dearborn, Michigan as guests of Ford Motor Company. Highlighting the trip was a tour of Ford's famed River Rouge plant, followed by the Annual Awards Banquet, with well-known educators and industrialists in attendance. During September and October, 712 students in all sections of the nation received cash and other awards valued at $50,000.

"There's no better measure of IAA's success than the enthusiastic reports we get from teachers themselves," said Barich. "Students seem to delight in competing with others their own age from all over the country. Teachers say that IAA provides strong incentive for better schoolwork, too."

Plans for the 1955 IAA program are now underway. Information regarding eligibility and project classifications is available by writing Industrial Arts Awards, Ford Motor Company, 3000 Schaefer Road, Dearborn, Michigan.

B

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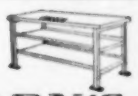

*Solve Storage Problems

No. 64-50-400C

Ample space for tools and projects in this Cabinet Base Woodworking Bench! Overall bench size is 64" long, 50" deep, 33¾" high. Smooth 2¼" laminated maple top is equipped with four woodworkers' vises. Dogs and bench stops also available.

Two cabinets (back-to-back) are each 36" wide, 21" deep, 31½" high. Each cabinet equipped with an adjustable shelf and double swinging doors.

Write for prices and complete specifications TODAY!

Send for Complete School Catalog!

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NEW PUBLICATIONS

(Continued from page 24A)

These high lights merely indicate some of the more important features of the new and revised material which has been incorporated into *Machinery's Handbook* as it appears in its fifteenth edition.

Industrial Arts Drawing and Blueprint Reading

By Shriver L. Coover and Chris H. Groneman. Paper, 254 pp., 7⅞ by 9¼ in., illus., $3.96. McGraw-Hill Book Co. Inc., New York City.

An excellent text introducing the beginner in drafting to the making of drawings, the interpreting of blueprints, and the making of drawings for projects in wood, sheet metal, electrical diagrams, floor plans, graphs, maps, and metalwork.

Experimental Electricity for the Beginner

By Leonard B. Crow. Paper, 283 pp., 8½ by 11 in., illus., The Scientific Book Publishing Co., Vincennes, Ind.

This interesting text on experimental electricity presents the subject in six chapters each of which introduces numerous interesting experiments.

Chapter I on magnetism and permanent magnets describes and illustrates 54 of these experiments.

Chapter II presents electrical circuits with 21 experiments. Chapter III on electromagnetism has 28; Chapter IV on induction and transformers, 32; Chapter V on bells, buzzers, switches, and relays, 23; Chapter VI on motors and controllers, 36.

The author does not intend that each student should perform all of these experiments. It depends on the selection of the teacher, which and how many are to be performed by the individual pupil.

There is hardly a doubt as to whether the ordinary course in electricity of a course replete with experiments will give the best results.

Developing Management Ability

By Earl G. Planty and J. Thomas Freeston. Cloth, 447 pp., 6⅛ by 9¼ in., $7. The Ronald Press Co., New York, N. Y.

The material in this book is arranged in question-and-answer form. The questions originally came from employers and businessmen who were trying to improve the training facilities in their own firms.

The material is divided into five parts which deal with the introduction, methods, types, organization and operation and evaluation of the development activities.

TV Receiver Trouble Cures Series

Vol. 1, 2, 3, 4, 5. Each volume over 115, 5¼ by 8¼ in., pages, illus., $1.80 each. John F. Rider Publisher, Inc., 480 Canal St., New York 13, N. Y.

This series contains explicit directions for correcting receiver troubles. Each remedy is suggested by the set's own manufacturer who also lists his model and chassis numbers. Each volume covers different manufacturers. Catalog numbers are: Nos. 143, 143-2, 143-3, 143-4, 143-5.

Matter Energy Mechanics

By Dr. Jakob Mandelker. Cloth, 73 pp., 6 by 9 in., illus., $3.75. Philosophical Library, New York, N. Y.

A small technical text which treats mechanics with the energy as its basis. It introduces also a new kinetic formula into the existing laws of mechanics. The whole builds mechanics around the energy concept of matter enunciated by Einstein in 1905.

How to Operate Excavation Equipment

By Herbert L. Nichols, Jr. Cloth, 150 pp., 6⅝ by 9¾ in., illus., $2.50. North Castle Books, Greenwich, Conn.

A small but important book on a subject which has increased greatly in size and volume in the past fifty years.

The book describes and gives pointers on how to operate revolving shovels, conveyor machinery, tractor loaders, hauling units, and graders and rollers. The descriptive material is well written and the book should be very helpful to those who want to learn how to operate this type of equipment, as well as those who are now working within the field.

Folk Art Motifs of Pennsylvania

By Frances Lichten. Boards, 96 pages. Price, $5.75. Hastings House, Publishers, New York 22, N. Y.

The folk art of the Pennsylvania Dutch is the earliest distinctly American rural art which has survived and which still is of major interest and art value. These pioneers Americanized the honest, direct, peasant art which they brought with them and they used motifs growing out of their contacts with the primitive condition of their farms and villages.

The present book is splendidly illustrated with typical designs taken directly from original sources. The author adds practical information about the problem of reproducing the original colors which are not readily available and makes suggestions for enlarging or transferring designs and for methods of working. The book can be used in school shops and arts and crafts departments.

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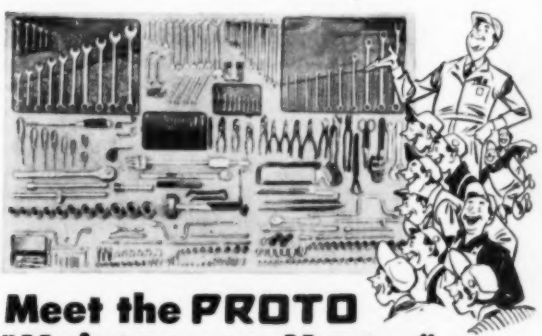

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Extensive research among industrial maintenance men has resulted in the new PROTO "Maintenance Master," designed to their specifications. You will appreciate its great efficiency because each tool will perform on many jobs. You can be proud to own the 9901, with its *Professional Quality*. Each tool is forged and heat treated for safety and long life. Advanced designs are great time savers and their guarantee protects your investment. Compare the completeness of the 9901 with your present tools or buy one from your PROTO dealer. Send 10¢ for 68-page catalog to

No. 9901 "Maintenance Master"
Contents: 5 socket sets and attachments, wrenches, pliers, screwdrivers, torque wrench, gauge sets, snips, puller, hacksaws, soft hammer, bars, screw extractors, special tools. No. 9902 has chest; No. 9903 has a "Toolmobile" cabinet.

PLOMB TOOL COMPANY
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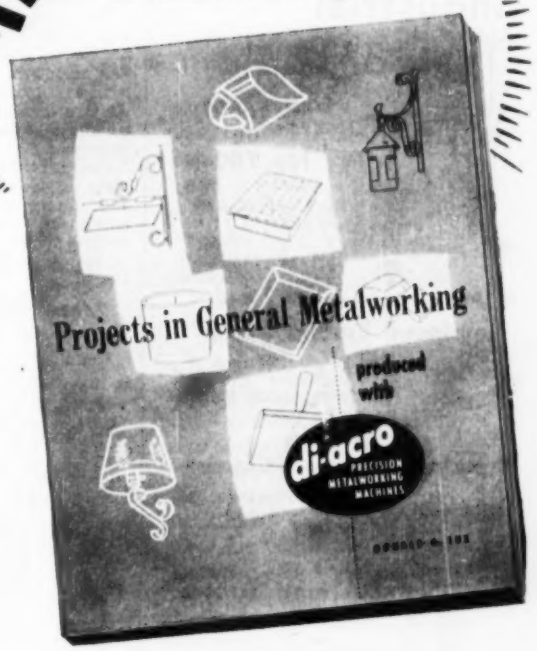
Eastern Factory—Jamestown, N.Y.
Canadian Factory—London, Ont.

IDEA BOOK for the Metalworking Instructor



32 PAGES of "How-To-Do-It" data

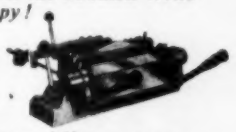
A copy of "*Projects in General Metalworking*" by Donald G. Lux, University instructor, is yours for the asking. Common metalworking projects, easily made with Di-Acro Machines, are clearly illustrated. Techniques are described such as bending scroll shapes, setting down a hem, and box and circle forming. Step by step procedure for making metal items like a pin-up lamp, kitchen scoop, nameplate bracket, waste basket and dustpan are easy to follow.

Simply make a request on your school letterhead and a copy of this valuable booklet will be mailed you promptly, and without charge. Classroom quantities are also available at 25c each.

Di-Acro Rollers, Brakes, Benders and other bench machines are ideal for the school shop. Complete specifications and costs are included with the booklet. *Write today for your free copy!*

DI-ACRO BENDER NO. 1

DI-ACRO is pronounced Die-ack-ro—the brand name for more than 40 hand and power operated precision cutting, punching and forming machines.


DI-ACRO FINGER BRAKE

DI-ACRO ROLLER

di-acro PRECISION METALWORKING MACHINES

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For School Use HARGRAVE "Industrial Tested Tools"

Four Corner Clamp No. 780

Available in four sizes with maximum capacities of 8" x 8" 12" x 12" 18" x 18" 24" x 24" Extensions available to increase above capacities.

Improved Spring Clamp

3 sizes — 4 different types of pressure tips.

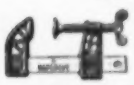
Standard Carriage Clamps

in 9 sizes for all average applications.

Steel Spindle Hand Screws

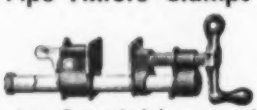
in 8 sizes for wood working. Jaws may be adjusted for various angles.

Quick Clamps



in 61 sizes in 12 different types. Fast . . . easy to use for all applications.

Pipe Fixture Clamps



in 2 sizes. Economical bar type clamp. Fits ½ – ¾" pipe.

No. 640 "I" Bar Clamp

in 7 sizes with patented quick locking moveable jaw. Three other type bar clamps available.

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TOOLS

SHOP EQUIPMENT NEWS

(Continued from page 38A)

The one pictured here is a 250-ampere capacity d.c. welding generator that was successfully operated and tested under actual working conditions.

The company in building this special unit, is primarily interested in knowing more about the gas turbine, and the possibilities it might hold for use in building more compact, lighter weight equipment. Greatly reduced weight and size are decided advantages of using the gas turbine that could well be the power of tomorrow.

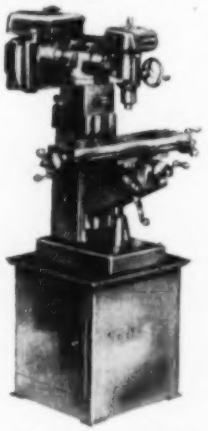
For a full description of this and other types of electric arc welders and electrodes and automatic and semiautomatic welding equipment, a.c. transformers and rectifier welders, write to *Hobart Bros., Troy, Ohio.*

(For Convenience Circle Index Code 1013)

CLAUSING VERTICAL MILLING MACHINE

The new Clausing Vertical Milling Machine is a heavy-duty machine tool that combines new exclusive features for greater versatility, accuracy, and ease of setup and operation.

The spindle head can be swiveled in a vertical plane and set at any angle, and turret rotated in a horizontal plane making it possible to mill at all angles with one setup.



Clausing Vertical Milling Machine

There are 7 ball bearings in the Clausing's heavy-duty drive. Ground spindle is hard-chrome plated; quill, ground and hard-chrome plated, has full length honed bearing in the head; ground overarm is an electric furnace casting with ¾-in. thick walls. The Clausing is a "sentitive" machine that handles small and large cutters with equal efficiency.

Table surfaces and all dovetail ways are precision ground. Ways have gibs for lasting accuracy. The 6 by 24-in. table has a 15-in. longitudinal and 5-in. transverse travel; 12-in. vertical knee travel; 8¾-in. maximum spindle to column; 3-in. quill travel; 6 spindle speeds; choice of No. 7 B&S or No. 2 MT spindle; operates from ½ or ¾ h.p. motor.

For additional information write Clausing Division, *Atlas Press Company, North Pitcher Street, Kalamazoo, Mich.*

(For Convenience Circle Index Code 1014)

NEW TYPE LOCK-R-RACKS

Precision Equipment Company announces production of their Lock-R-Racks — a new type of compact storage unit for employees' apparel and valuables. These units consist of

MACHINE SHOP OPERATIONS and SETUPS

Authored by Authorities . . .

Harold W. Porter, Associate Professor of Teacher Training in Trade and Industrial Education, Purdue University; Formerly Vocational Instructor and Assistant Supervisor in Trade and Industrial Education, State of Wisconsin; **Charles H. Lawshe,** Professor of Psychology, Purdue University; Formerly Dean, Mechanic Arts School, Evansville, Indiana; Consultant on Industrial Training; **Orville D. Lascoe,** Professor of Manufacturing Processes, Purdue University; Formerly Director, Industrial Arts and Vocational Education, State of Kentucky.

To Meet Your Demands . . .

Based on the findings of a national, industry-wide survey, this new text incorporates the demands of modern machine shop instructors into a highly-integrated and comprehensible medium of up-to-date instructional material.

Designed to do away with useless repetition of outmoded practices, this book provides only the latest on fundamentals, operations, and safety practices — all well supplemented by more than 400 ultra-clear visual aids.

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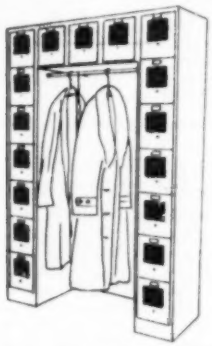
strong steel box lockers 10 by 10 by 18 in., for hats, purses, etc., and a sturdy iron pipe rod for coats. They may be had in capacities ranging from 15 to 38 locker openings, with number plates and padlock attachments. Built-



New Type Lock-R-Racks

in flat key locks are available at a slight additional charge. A Lock-R-Rack to accommodate 17 persons consists of 17 box lockers and a 30-in. coat rod. Such a rack will be 76 in. high, 50 in. wide, and 18 in. deep.

For further information write to *Precision Equipment Co., 3714 Milwaukee Ave., Chicago 41, Ill.*

(For Convenience Circle Index Code 1015)

COPPER ENAMELING KIT

Now everyone can enamel-on-copper with the complete and unique kit available from Gem-Craft.

This kit contains a multitude of supplies needed for the craft, including a firing kiln that meets Underwriter Laboratories' specifications. A distinctive and exclusive feature of this electric unit is its pyrex top which permits the workman to view his handiwork while it is in the process of being fired.

Copper Enameling Kit

Jewelry-store quality earrings, brooches, pins, cuff links, and an ashtray can be made with this Gem-Craft set. A total of 75 pieces and a detailed instruction booklet, simplifying the craft, are furnished.

For further information write to *Gem-Craft, 1812 E. 13th St., Dept. (EN), Cleveland 14, Ohio.*

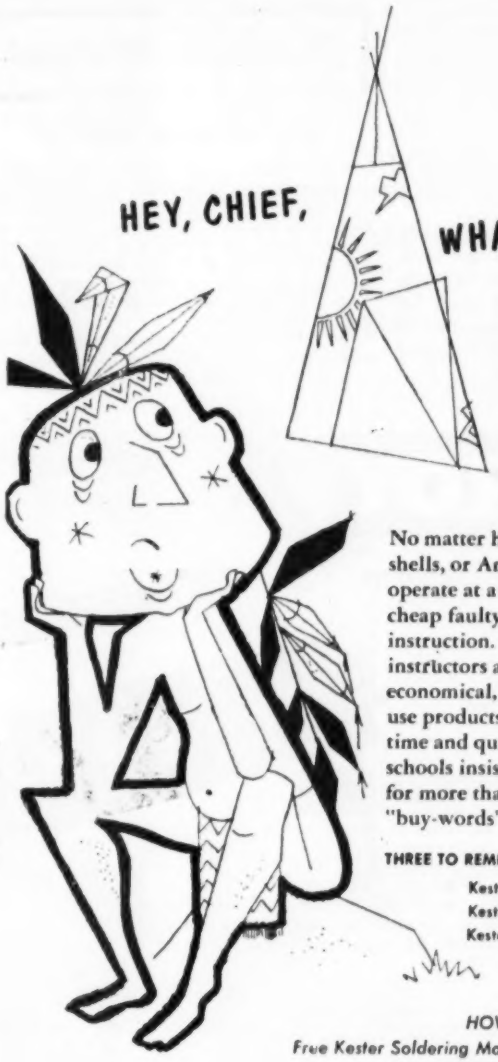
(For Convenience Circle Index Code 1016)

NEW MURPHY HAND CARVING KNIFE

Robert Murphy's Sons Company are manu-

New Murphy Hand Carving Knife

(Continued on next page)



No matter how you measure it—beads, shells, or American dollars—you operate at a loss when you employ cheap faulty materials for classroom instruction. In the long run, most instructors agree, it's a lot more economical, a lot more satisfactory to use products that stand every test of time and quality. That's why so many schools insist upon Kester Solder, for more than 50 years the supreme "buy-words" in Solder.

THREE TO REMEMBER . . .

Kester Acid-Core Solder
Kester Plastic Rosin-Core Solder
Kester "Resin-Five" Core Solder

HOW MANY do you need?
Free Kester Soldering Manuals . . . instructor edition and student edition. Write today!

KESTER

SOLDER COMPANY

4237 WRIGHTWOOD AVENUE, CHICAGO 39, ILLINOIS
NEWARK 5, NEW JERSEY • BRANTFORD, CANADA

(Continued from previous page)

facturing a new hand carving knife which because of its handy shape and ability to hold a sharp edge will be welcomed by those who love to whittle and carve.

For further information write to *Robert Murphy's Sons Co., Ayer, Mass.*

(For Convenience Circle Index Code 1017)

The water pumped and the steam generated by oil refineries in the Gulf Coast are sufficient to meet the domestic requirements for water and heat of about one fifth of the entire population of the United States. — *Petroleum Newsnotes.*

Descriptive Material

NEW ELECTRICAL STUDY KIT

The "Visual Experiment" approach to electricity makes a difficult subject easy and enjoyable. A new, four-page bulletin issued by Crow Electric-Craft Corp., describes the Crow Electri-Kit Model 41B for Beginners, latest in a series of "Visual Experiment" kits designed to bring an understanding of electricity to the widest possible audience at the lowest possible cost.

Model 41B Electri-Kit is suitable for either individual self-instruction or for group instruction. It contains 115 parts for constructing over 100 operating assemblies plus a 240-page, fully illustrated text-manual. Each experiment illustrates a definite electrical principle, and experiments are so organized that the relationship between principles becomes vividly clear.

A new bulletin gives complete details about this Beginners' Electri-Kit. Write *Crow Electri-Craft Corp. (division of Universal Scientific Co., Inc.), 1102 Shelby Street, Vincennes, Ind.*

(For Convenience Circle Index Code 1018)

NEW ASSOCIATION FILMS CATALOG PUBLISHED

Association Films, national distributor of 16mm. sound motion pictures, announces publication of its 40th annual film catalog, *"Selected Motion Pictures."* More than 1400 free-loan and rental films, available to clubs, schools, industrial plants, television stations, and community organizations are described.

The company's 175 free films are now listed alphabetically in one section, and are cross-indexed by title in other sections, according to subject matter.

Copies of this catalog may be had by writing the branch libraries of *Association Films, Broad and Elm, Ridgefield, N. J.; 79 E. Adams St., Chicago, Ill.; 1108 Jackson St., Dallas, Tex.;* and *351 Turk St., San Francisco, Calif.*

(For Convenience Circle Index Code 1019)

DO-IT-YOURSELF FURNITURE

The Phillips Furniture Company has just published a design folder featuring its new line of Do-It-Yourself furniture. The folder is titled *Build It in Minutes* and shows a variety of furniture, some of which can be built in minutes.

The designs follow the trend of today's living and by means of simplified construction makes available for the home craftsman, items which are in demand in the better stores.

The line includes some interesting and exclusive furnishings which, at the present time, are available only by mail.

For further information write to *Phillips Furniture Co., 2560 Fon du Lac Drive, East Peoria, Ill.*

(For Convenience Circle Index Code 1020)

SCHOOL WORKSHOP PLANNING BOOKLET

A new 42-page booklet on the planning of school workshops has just been published by Rockwell Manufacturing Company's Delta Power Tool Division.

The book, which includes international-contest-winning plans chosen by five American leaders in the school field, is intended as an aid to school planners in expanding school shop facilities to meet the needs of sharply increasing enrollment.

Entitled "School Shops for Today and Tomorrow," the new booklet is intended to replace one entitled "How to Plan a School Workshop," which was published by Delta 22 years ago.

Specifically, the booklet includes 25 sets of plans, most of these including two drawings — one of an existing shop, the other showing how the shop could be rearranged for bigger classes.

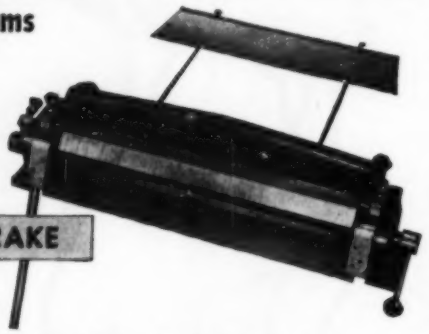
All plans are fully explained and discussed in accompanying text, and the booklet concludes with brief chapters on "Principles of Machine Arrangement," "Budgets," and "Principles of Shop Planning."

For a copy of this booklet (price $1 — lower rates for school people) write to *Rockwell Mfg. Co., Delta Power Tool Div., 400 N. Lexington Ave., Pittsburgh 8, Pa.*

(For Convenience Circle Index Code 1021)

BERKROY 24" SHEET METAL TOOLS

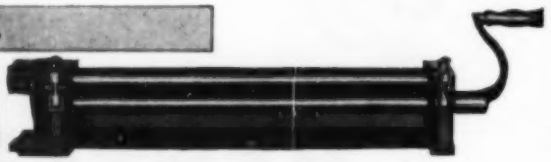
Enlarged Training Programs Possible With These Production Tools of Advanced Design



24" BOX AND PAN BRAKE

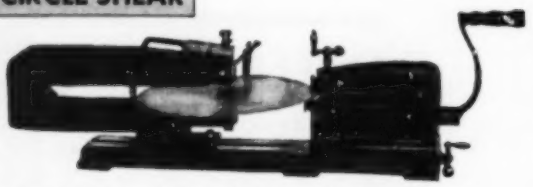
Turning a knob provides infinite adjustment to any angle from 0° to 135°. Forms any size box or pan from ½" to 24" by ¼" graduations. Makes intricate folds, reverse bends and radius bends on sheet steel up to 16 gauge and up to 24" wide. Bending leaf operates on Torrington Needle Bearings. Full 1" clearance between top fingers and anvil. Maximum 2½" box or pan depth permits deeper bends.

24" SLIP ROLL



Finger-tip controls on both ends of top roll permit quick adjustment for any material thickness within capacity of unit. Will accurately roll 24" widths in 20 gauge mild steel—heavier gauges in narrower widths. Removal of work is easily accomplished due to the spring loaded, hinged, top roll. Heavy duty rolls 1½" diameter—distortion proof channel iron base, enclosed gears and oilite bearings are a few of many features.

24" RING AND CIRCLE SHEAR



Equipped with MICRO-FEED control of circle diameters—an exclusive feature. Cuts rings and circles up to 24" diameter. Handles a wide variety of trimming operations, strip cutting and contour cutting on sheet metal up to 20 gauge. Cutters are hardened, tempered tool steel. 32" x 7" bed length, 12" x 4½" shear, and 21" x 3¾" clamping head. Accurately machined, enclosed gears and rugged construction throughout.

SOLD THROUGH INDUSTRIAL DISTRIBUTORS

for catalog information, write to
BERKROY PRODUCTS, INC.
2512 N. ONTARIO STREET • BURBANK, CALIFORNIA

attention shop teachers

Here's the Widest Assortment of Top Quality Products in

Hardware • Machinery Tools • Metals

for Woodworking and Metal Working Shops

Patterson Brothers—one of the oldest and most reliable names in the business—is again ready to supply your every shop need with outstanding quality and service.

Our new school shop catalog will be available early in 1955. It's going to be outstanding, complete and entirely new! Get your name on the list now. In the meantime, check our prices and compare our service.

It's *smart* to buy BLUE RIBBON lines from a BLUE RIBBON source . . .

PATTERSON BROTHERS

SINCE 1848

15 PARK ROW, NEW YORK 38, N.Y.

Idea! for School Shops — and Budgets, too!

NEW PORTABLE ELECTRIC JIG SAW DOES WORK OF 7 DIFFERENT SAWS

Cuts Wood, Plastics, Metals, Composition Materials, etc.

DALTON

MODEL D-500

Portable ★ Electric

JIG SAW

Exclusive PISTOL GRIP HANDLE obsoletes the old style method of gripping such a tool around the motor housing to operate it . . . provides COOLER handling, GREATER sawing accuracy through its easier operation and control.

FAST, POWERFUL, RECIPROCAL ACTION

7 SAWS IN ONE

Does the work of a—

- Rip Saw
- Coping Saw
- Scroll Saw
- Crosscut Saw
- Jig Saw
- Band Saw
- Keyhole Saw

The Dalton D-500 is "made-to-order" for the school shop. It performs a multitude of cutting operations quickly, easily, accurately. And if you are working on a tight budget, it saves on investing in single purpose machines. In addition to the Pistol Grip Handle, other outstanding features include: A specially built motor that insures fast feeding speeds, no jumping or chattering; Air stream blows sawdust off guide line; Oilite bearings, hardened steel gears; Quick, easy blade changing; Makes its own starting hole for inside cuts; Cable with anti-kink spring. Will even cut a 2 x 4! Comes complete with five different blades.

IT CUTS — Circles straight lines, intricate designs in Wood, Plastics, Metals, Composition Boards, Hard Rubber, Leather, and others.

If not stocked by your hardware supplier, have him order for you.

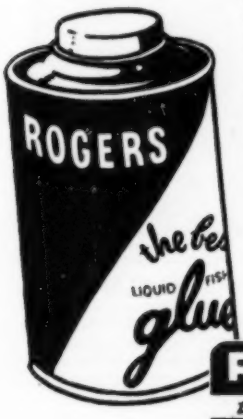
COMPLETE SPECIFICATIONS SENT ON REQUEST.

DALTON MFG. CO., 20 S. Central, St. Louis 5, Mo.

PROVED IN INDUSTRY always dependable

ROGERS

Over 3,885 lbs. Actual Shearing Strength per Square Inch



Used by Furniture Manufacturers — Cabinet Makers — Carpenters — Craftsmen — Upholsterers — Shoe Manufacturers—and in factories, shops and homes, wherever Dependable Glue is Needed.

TRY ROGERS IN YOUR SHOP — Ready to Use — Easy to Use — Always Uniform — Economical. Prove to Yourself why ROGERS IS BEST!

SEND FOR INTERESTING — NEW — PROJECT PLANS and Rogers Book of Woodworking Shop Notes with helpful data. They're FREE! Write TODAY!

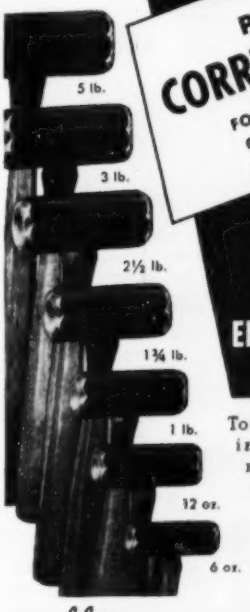
ROGERS

the best LIQUID FISH GLUE

GLOUCESTER, MASS.

PICK THE CORRECT HAMMER

FOR EVERY STEEL STAMP, CHISEL, STAR DRILL, OR SLEDGING APPLICATION



Mecco **SAFETY ENGINEERS' HAMMERS**

"STYLE OE"

To minimize spalling and mushrooming, "Style OE" Hammers are machined of Mecco Safety Steel, carefully heat treated in sizes to meet your needs. Available in the right weight for every application.

Write for complete data

Mecco **SAFETY** MARKING TOOLS

M.E.CUNNINGHAM CO.

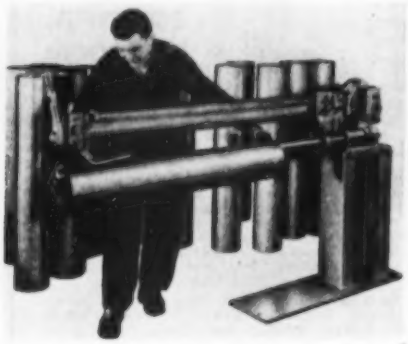
1037 CHATEAU STREET, PITTSBURGH 33, PA.

Shop Equipment News

NEW NIAGARA POWER GROOVER

With interchangeable horns and rolls, the new Niagara Universal Power Groover (Model 48-U) will close both single lock seams and Pittsburgh lock seams.

Power driven, it is designed to reduce operator fatigue while eliminating the noise, delays, and uncertainties of hand tools. Convenient controls provide fast, smooth operation to speed production.



New Niagara Power Groover

With a nominal working length of 48 in., the groover is equipped with adjustable stops to hold work stationary on the horn. Rolls are mounted in swinging cradles to permit front roll engagement on outstroke and rear roll engagement on return. Adjusting wheels enable regulation of roll pressure to conform with thickness of material.

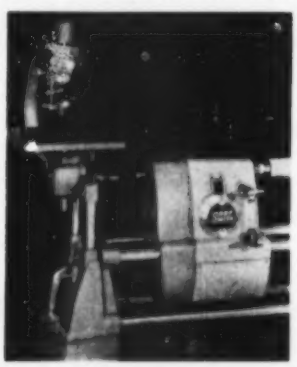
Widths of grooves in the rolls and horn for single lock seaming are 3/8, 1/2, and 5/8 in. while the horn for Pittsburgh lock seaming has a 7/16-in. groove width.

Descriptive literature may be obtained by requesting Bulletin 76-B from *Niagara Machine & Tool Works, 683 Northland Avenue, Buffalo 11, N. Y.*

(For Convenience Circle Index Code 1001)

NEW SHOPSMITH POWER MOUNT

Shown herewith is a close-up of a power mount which is furnished with the new Shopsmith Mark 5. This power mount is the combination of twin-tube mounting holes in the headrest, plus a power source from two auxiliary spindles. It allows other major tools, like jigsaw shown here, jointer or band saw, to be plugged in quickly and safely without dangerous belts and pulleys. With Power Mount, Shopsmith Mark 5 can handle many jobs that require saw jointer, jigsaw sander, lathe-honing wheel, and coarse and fine sanders. The flexible coupling transmits power smoothly from drive spindle.



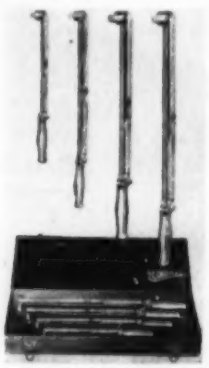
New Shopsmith Power Mount

For complete information about this versatile machine write to *Magna Engineering Corp., Menlo Park, Calif.*

(For Convenience Circle Index Code 1002)

NEW WILLIAMS TORQUE WRENCHES

This new series of Torque Measurrenches, for measuring right and left hand torque, employs the time-proved converging scale method of torque reading developed and patented by Williams.



New Williams Torque Wrenches

Accuracy is not dependent on delicate gears, levers, or dials. There are no mechanisms to get out of order. These wrenches are built to withstand hard abuse to the extent that ordinary accidents such as dropping will not destroy their accuracy.

They are available in four capacity ranges in two drive sizes from which it is possible to select a capacity range that will give the most accurate torque measurements.

For more complete information write *J. H. Williams & Co., 400 Vulcan St., Buffalo 7, N. Y.*; and ask for folder No. A-460.

(For Convenience Circle Index Code 1003)

A NOVEL NEW SAW BLADE

Skil Corporation, manufacturer of portable power tools, has placed on the market a new saw blade discovery.

The new blade cuts two ways — in either direction of rotation. The two-way cut and self-honing result from a completely new design in saw tooth form.

The new blade is used in one direction of rotation until the cutting edges of the teeth become dull. The blade is then reversed in the saw. As the blade cuts in the new rotation, the cutting edges used in the original rotation are automatically honed to a new sharpness. Skil engineers state that frequent reversing of the blade prolongs the cutting life with little diameter loss resulting from the frequent honing.

The two-way blade is made of special alloy steel and has a special rust-resistant and

A Novel New Saw Blade

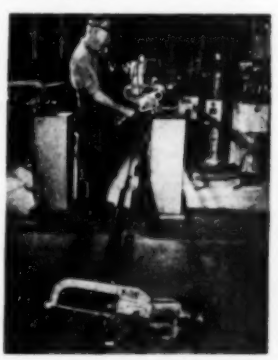
glare-free black finish. Skil tests show the new blade "has a 50 per cent harder cutting edge than regular blades and it will last four times as long." It is available in sizes of 5 3/8, 7 1/4, and 8 1/4 in. All two-way blades have diamond arbors, since they were designed for Skil saws.

For complete information write to *Skil Corporation, 5033 Elston Ave., Chicago 30, Ill.*

(For Convenience Circle Index Code 1004)

PORTABLE POWER HACK SAWS WORK IN ANY POSITION

Any job that requires hack saw work generally results in a great deal of wasted effort, especially maintenance jobs at off-the-floor locations. Sawing by hand, while standing on a stepladder is an awkward, inaccurate, and time-consuming job.



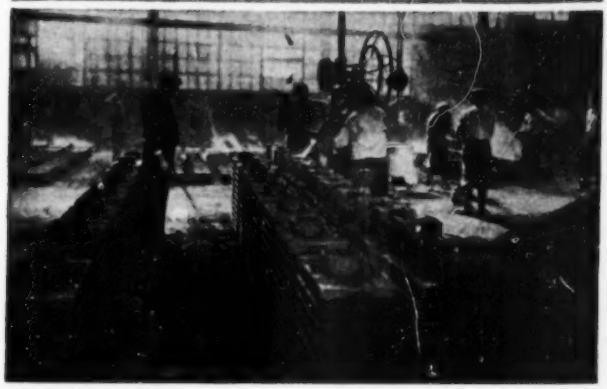
The Hand-I-Hack used on bench or on the floor

The Lipe-Rollway Hand-I-Hack is a portable power saw which can be carried to the job and cuts in any position metal, plastic, or fiber stock of 3 in. or less diameter at any angle from 45 to 90 deg.

For further information write to *Lipe-*

(Continued on page 34A)

YOU WILL FIND STERLING FLASKS IN MORE THAN 4500 FOUNDRIES



The above stack molding technique was made possible by using Sterling flash sections to step up casting production. Ten flash sections are being poured at a time. A common sprue through the stack feeds the molten metal to runners leading to individual castings cavities.

Sterling Steel Flasks are ideal for stack molding because they are built to withstand terrific pressures.. A reinforcing rib around the side prevents distortion and misalignment of stacked molds. Top and bottom have solid sand flanges. Full width bearing.

Write for new catalog describing the complete Sterling line.

STERLING WHEELBARROW CO. Milwaukee 14, Wis., U. S. A.

Sterling FOUNDRY FLASKS

New, Large Metal PROTEXEM Paint Brush Conditioner

Designed for Shop Use

This new metal rectangular PROTEXEM Paint Brush Conditioner assures many years of service.

PROTEXEM'S Vapor Action has proved to be the best system for keeping brushes soft and ready for use for over 10 years.

You can put brushes away at the end of the day and they will be ready for use the next morning when class opens. A real time and brush saver.

Write for Information and Special School Price

WISCONSIN LABORATORIES, Inc.

Dousman, Wisconsin

GREAT NEW CATALOG!

NOW READY FOR TEACHERS OF

INTERNAL CARVING OF PLASTICS

BRINGS YOU AMERICA'S LARGEST SELECTION OF CARVING SUPPLIES FOR USE IN THE SCHOOL SHOP

Send for FREE copy today! It contains hundreds of items — fully illustrated. Gives school discounts on everything you need for shop projects in plastic carving:

FREE
INTERNAL CARVING INSTRUCTION SHEETS
for Distribution to Students

Describes basic techniques in carving, dyeing and filing. Simply make request on your school letterhead, stating quantity required, and they will be mailed without charge.

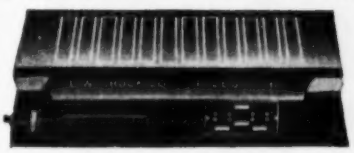
- **PLASTIC SHAPES AND ACCESSORIES**
- **FINDINGS** • **SHEETS**
- **TUBING** • **RODS**
- **SALVAGE MATERIAL**
- **MANUALS** • **DRILLS**
- **TOOLS**
- **READY-TO-CARVE GIFT ITEMS**

D. W. COPE PLASTICS

11640 Bellefontaine Road St. Louis 15, Mo.

Address Dept. Y

FINE MAGNETIC CHUCKS PRICED UNUSUALLY LOW



Grip work tightly for wet or dry grinding. Guaranteed waterproof. Connections for either 110 or 220 volts D. C.

8½" x 13" **$55.37**
6½" x 18" **$73.40**
8" x 24" **$146.00**
10¼" x 37" **$280.00**

DEMAGNETIZERS

Instantly demagnetize tools or production parts. No moving parts. 110 volt, 60 cy. A.C.

PLATE-TYPE

MODEL B-2 7¾" x 12½" x 6¾" Ship. wt. 55 lbs. **$73.45**

MODEL J-1 7¼" x 7¼" x 6¾" Ship. wt. 35 lbs. **$47.83**

ROUND TYPE 3¾" opening **$27.50**

RECTIFIERS

A. C. input 110 volts. D. C. output 110 volts P-1 for 5½" x 13" chuck 0.8 amps. **$45.04**

P-2 for 6½" x 18" chuck 1.0 amps. **$52.30**

P-3 for 8" x 24", 10¼" x 37" chuck 3.0 amps. **$69.73**

DEMAGNETIZING SWITCHES

For 5½" x 13" and 6½" x 18" sizes **$10.35**

Field discharge type for 8" x 24" and 10¼" x 37" **$18.90**

L-W CHUCK COMPANY 71 SO. ST. CLAIR ST. TOLEDO 4, OHIO

Hotpack ELECTRIC CERAMIC KILNS

1. Eye level controls — pilot light. 2. Built-in pyrometer for visible accurate temperature indication. 3. Handles are cool to touch. 4. Control switch — low, medium, and high heat for even distribution. 5. Special insulation holds heat and prevents scorching of table top. 6. Maximum temperature 2050° F.

SPECIFICATIONS

Model No.	Interior Size	Shelves Furnished	Approx. Time	Price F.O.B. Phila.
7006	8"x 8"x 5½"	1	3 hrs.	$ 65.00
7004	8"x 8"x11"	2	4 hrs.	$ 95.00
7005	12"x12"x11"	2	3 hrs.	$205.00
7007	15"x15"x16½"	3	4 hrs.	$410.00
7009	12"x12"x 5½"	1	4 hrs.	$105.00

Enameling on copper can be efficiently fired on our models No. 7006 and 7009.

THE ELECTRIC HOTPACK CO., INC.
5067 Cottman St. Philadelphia 35, Pa.

GET THE WORLD'S FINEST TOOLS AT BIG SAVINGS

When it comes to equipping the school shop with power tools . . . it makes good sense to LOOK TO MALL FOR THE FINEST. Mall tools are the choice of men who make a living with tools. And now YOU can purchase top quality Mall tools at TREMENDOUS SAVINGS through the Mall School Purchase Plan . . . which applies to any and all of the hundreds of different Mall tools available. Write now.

40 Factory-Owned Service Warehouses, Coast to Coast, To Give You Fast, Dependable Service

MAIL THIS COUPON TODAY

MALL TOOL COMPANY PORTABLE POWER TOOLS GASOLINE—ELECTRIC—AIR
7798 S. Chicago Ave., Chicago 19, Illinois

TELL ME ALL ABOUT THE MALL SCHOOL PURCHASE PLAN

Name_____
School_____
Address_____

IU-116

SHOP EQUIPMENT NEWS

(Continued from page 32A)

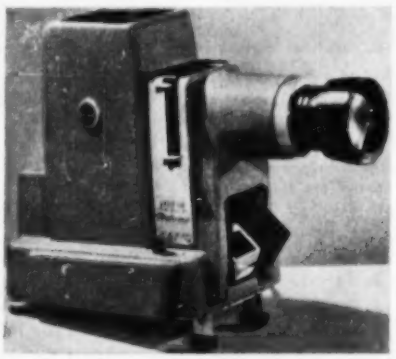
Rollway Corp., 830 Emerson Ave., Syracuse 1, N. Y.

(For Convenience Circle Index Code 1005)

NEW FILMSTRIP, SLIDE PROJECTOR

A new Kodaslide Projector, the Signet 500, for showing both single-frame filmstrips and 2 by 2 slides to large and small groups, has been announced by the Eastman Kodak Company.

Conversion from one use to the other can be accomplished quickly and easily, since it is only a matter of loosening a screw to interchange the filmstrip adapter and slide-feeding mechanism.



Kodaslide Signet 500 Projector

The Kodaslide Filmstrip Adapter is easy to load and protects the filmstrip from scratching. A unique Geneva mechanism rapidly and accurately advances the filmstrip. The film can be reversed to show previous frames.

The Kodak Signet 500 features a quiet, powerful impeller-type blower which protects the film and provides cool, comfortable operation. With the three-way switch the lamp can be operated only when the blower is on; also, the blower can be used to speed up cooling following projection and facilitate changing of lamps during a showing.

A choice of lenses adds to the versatility of this new Kodak projector. In order to meet a wider variety of projection needs, it is supplied with either an f/3.5 or an f/2.8 Kodak Ektanon Lens.

For further information write to *Eastman Kodak Co., Rochester 4, N. Y.*

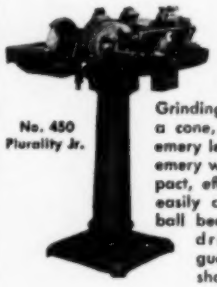
(For Convenience Circle Index Code 1006)

DREIS & KRUMP AUTOMATIC ELECTRIC PRESS BRAKES CONTROL

Dreis & Krump Manufacturing Company announces new automatic electric control for their line of press brakes. The unit consists of foot switch, solenoid for operating the clutch, automatic switch box, and a control panel. This control panel through individual switches permits setting the machine for the following operations: inching; inching — nonrepeat; inching down — self-return — nonrepeat; inching — preset stop; inching — preset stop — nonrepeat; double clutch — preset stop — nonrepeat; one- or two-man operation.

This new automatic control will increase production on all types of press brake work. It eliminates whipping and work spoilage due to kinking, reduces operator fatigue to a minimum, and the predetermined stop provides greater safety for the operator.

TOOLS ALWAYS SHARP WITH PLURALITY OILSTONE TOOL GRINDERS



No. 450 Plurality Jr.

NOW AVAILABLE IN 3 SIZES
No. 425 Plurality Sub Jr.
No. 450 Plurality Jr.
No. 475 Plurality

Grinding can be done on a cone, coarse or fine or emery leather stropping or emery wheels. Unit is compact, efficient, serviceable, easily accessible and has ball bearing direct motor drive. Especially guarded for school shop use. Details on request.

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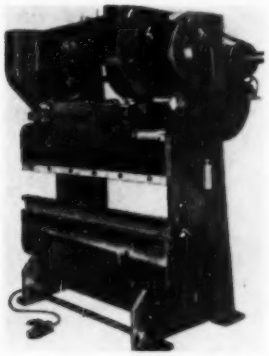


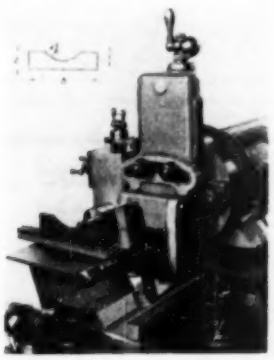
Automatic Electric Press Control

Further information on the automatic electric control may be obtained from *Dreis & Krump Mfg. Co., 7400 S. Loomis Blvd., Chicago, Ill.*

(For Convenience Circle Index Code 1007)

A FOLLOWER EQUIPPED SHAPER

The operation time for machining the bridge bearing plate shown in the illustration, has been reduced from 74 minutes to 20 minutes by the application of a follower equipped Cincinnati Metal Working Shaper.



A Follower Equipped Cincinnati Metalworking Shaper

This machine is a 24-in. heavy duty Cincinnati shaper, equipped with a Turchan automatic follower. In one 20-minute operation, this shaper accurately produces a radial bearing seat that formerly required two setups and two machining operations.

For detailed information, write to *The Cincinnati Shaper Co., Garrard and Elam Sts., Cincinnati 25, Ohio.*

(For Convenience Circle Index Code 1008)

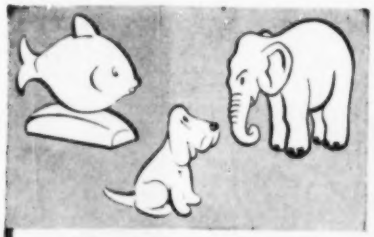
DeWALT NEW POWER BRAKE

A safety power brake, which virtually eliminates *drift* time of the cutting tool after the motor has been shut off, has been announced by DeWalt Inc., as an optional accessory for their line of "Power Shop" machines.

The power brake, a definite safety advance particularly for inexperienced users of power tools, reduces the drift time of 3 to 4 minutes of a revolving 9-in. saw blade to about 5 seconds after the current to the motor has been cut off.

For complete information about this val-

(Continued on next page)



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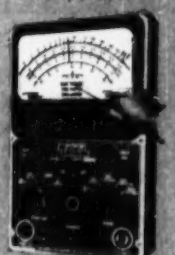

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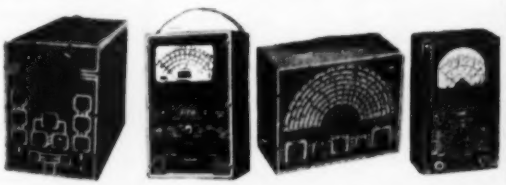

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SHOP EQUIPMENT NEWS

(Continued from previous page)

DeWalt New Power Brake

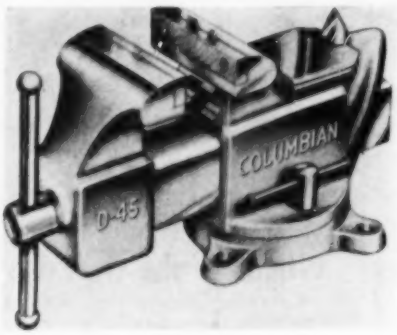
uable safety device, write to *DeWalt Inc., Subsidiary — American Machine and Foundry Co., Lancaster, Pa.*

(For Convenience Circle Index Code 1009)

THE NEW COLUMBIAN D-45 VISE

A new workshop vise, which meets the needs of farmers, home craftsmen, and "do-it-yourself" workers, is announced by The Columbian Vise & Mfg. Co., Cleveland.

Known as Columbian Workshop Model D-45, the new vise has a jaw width of 5 in., and a 6-in. jaw opening. This vise is not a conversion nor an "adaptation" of a previously available smaller vise.



New Columbian D-45 Vise

Other Columbian D-45 dimensions are: pipe capacity, ⅛–2½ in.; beam size, ¼-in. steel channel measuring 1⅞ by 2¼ in.; jaw depth, 3⅝ in.; and weight, 38 lb.

For further information write to *The Columbian Vise and Mfg. Co., Cleveland, Ohio.*

(For Convenience Circle Index Code 1010)

BERKROY RUBBER STAMP PRESS

The Berkroy Products Company announce the production of the new Berkroy Rubber Stamp Press.

It is compact in size, low in cost and of high quality of production. This press makes it possible for all schools to own their own rubber stamp press.

Berkroy Rubber Stamp Press

For full information on this rubber stamp press, write to *Berkroy Products Co., 2516 North Ontario St., Burbank, Calif.*

(For Convenience Circle Index Code 1011)

NEW FLUORESCENT ADJUSTABLE TRIANGLE

A new fluorescent adjustable triangle has been added to the Alvin line of drafting instruments and supplies. It is precision designed of acrylic fluorescent plastic, having an orange tint which produces a self-illuminating orange light from all edges. Contrasting die-sunk graduations are in black assuring permanent accuracy on a transparent protractor facing, with beveled edges to eliminate any

(Continued on page 38A)

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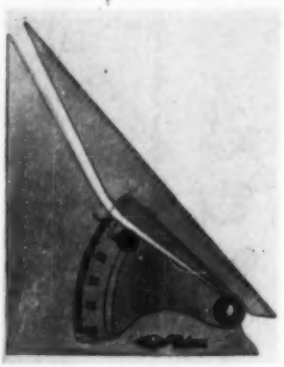
(Continued from page 36A)



Fluorescent Adjustable Triangle

possibility of parallax. This adjustable triangle is also available in crystal clear acrylic Plexiglas.

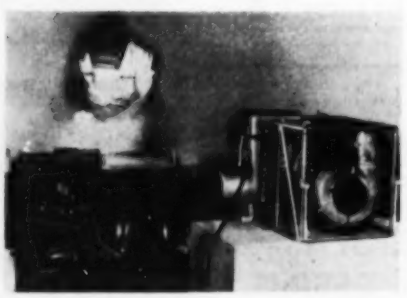
For additional information write to *Alvin & Co., Windsor, Conn.*

(For Convenience Circle Index Code 1012)

NEW TURBINE TYPE ARC WELDER

Hobart Brothers scientific research division has developed an arc welder which uses a gas turbine as a prime mover.

(Continued on page 28A)



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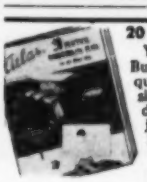

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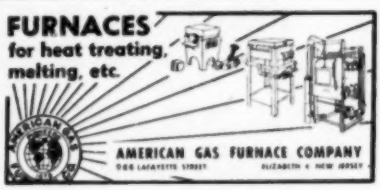

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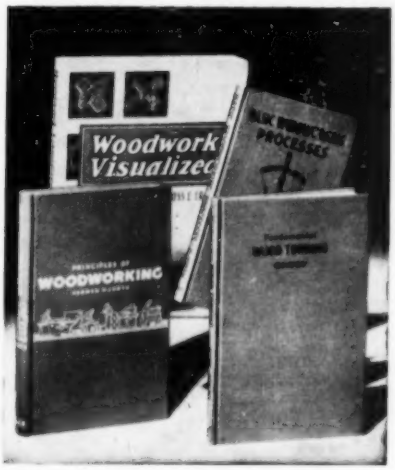

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